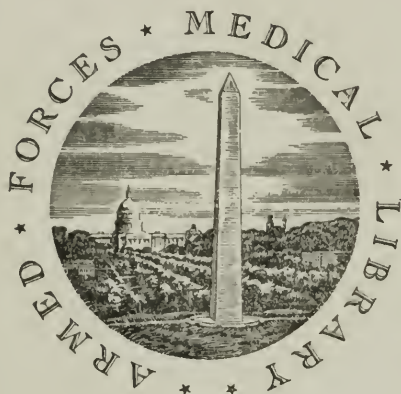


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A REPORT

*L. M. M. S. L.
Spruce at. 9th.
No 295 Spruce*

ON THE RESULTS OF A SPECIAL INQUIRY INTO

The Survey of 1845
THE

PRACTICE OF INTERMENT IN TOWNS.

MADE

AT THE REQUEST OF HER MAJESTY'S PRINCIPAL SECRETARY OF STATE
FOR THE HOME DEPARTMENT.

BY

EDWIN CHADWICK, Esq.

BARRISTER AT LAW.

ANDREW

PHILADELPHIA:
PRINTED BY C. SHERMAN.
1845.

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THE WOODLANDS CEMETERY.

This beautiful rural Cemetery, formerly the Country Seat of the Hamilton Family and embracing more than three times the extent of ground contained in any other Cemetery near Philadelphia, is now prepared for interments.

Citizens generally are invited to visit the grounds and judge for themselves of its scenery, convenience and general adaptation to the objects to which it has been devoted. The improvements begun will be prosecuted to a high state of finish and ornament in respect to buildings, gravelled ways, lawn, flowers, shrubbery and trees; of the latter it is intended to procure every variety of which the climate will admit that will enhance the beauty of the scene.

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Of the quality of the soil, &c., the following certificate has been furnished to the Managers of the Cemetery by three of the principal Undertakers of the City.

“Having buried in this Cemetery, the undersigned certify that the soil is of the best kind for the purpose, being a dry gravel and sand. The superintendant will be found prompt and obliging, and the beauty of the scenery unsurpassed.

WM. H. MOORE, No. 181 Arch street,

WM. HUGHES, No. 102 North Eighth street.

GEORGE PICKERING, 10th Presbyterian Church.”

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Application for Lots may be made to the Treasurer at No. 309 Arch street, above Eighth street.

TERMS.—50 cents per square foot for lots in perpetuity. For single graves \$7 50; digging graves \$2 50 for all sizes of the depth of seven feet.

JACOB LEX, *President.*

CHARLES E. LEX, *Secretary.*

JOSEPH B. TOWNSEND, *Treasurer.*

Wm. Carvill, Gardener on the premises, will supply flowers and shrubbery to the owners of lots and the public.

A REPORT

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11-24-82
Washington

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AMERICAN PREFACE.

THE following chapters from Mr. Chadwick's Report on the subject of interments in towns, contain general truths alike interesting and important on either side of the Atlantic. It is true that the evils treated of are less aggravated in a country of more recent settlement than in Europe, where they have become inveterate from repetition through successive ages and centuries. Yet they have been to some extent felt in the cities of the United States, and it will be wise in us to take timely warning and avoid the shocking abuses, now difficult of cure, to which the cities of the old world have attained. There the reform has been begun from dire necessity; forewarned of these evils and governed by wisdom, taste, and humanity, let us bury the dead where they shall not be an offence to the living, and themselves a source of pestilence and mortality.

The chapters omitted, happily, have little application in the United States. Though legislation would be salutary as far as to restrain burials within cities after prescribed periods, the establishment of burial-places under public management, in alliance with an established church, would not be consonant to our institutions; and where a family is seldom crowded into a single room, as in Europe, the proposed regulation for the immediate removal of the dead to a common receptacle, is not felt to be a requisition of humanity.

What is said, therefore, upon these and other evils scarcely known here, is comparatively unimportant and not republished.

The legal opinion of Lord Stowell, now republished, shows how limited and precarious is the tenure by which the dead hold their last resting-place; it endures only till their remains are resolved into their kindred dust, "when their dust will help to furnish a

place of repose for other occupants in succession." But who are ordinarily the judges when man's remains have so far returned to their kindred dust, as thus of right to give place to successive occupants? They are those most interested and most tempted by cupidity to anticipate this natural process of decay, and the investigation recently made by Parliamentary authority, exhibits the most shocking details of the systematic displacement, for ages past, of old bodies for new occupants,—“Ere the moist flesh hath mingled with the dust.”

By the regulation of the modern cemeteries, of a rural character, in this country, this horrid evil is necessarily averted, where each purchaser becomes the proprietor, for burial purposes, of his own plot; and the preservation of the remains of the buried is thus committed to the guardianship of relatives and friends, whose sacred regard for them cannot be wounded by the temptations of cupidity and crime in others. Here they will be placed beyond the reach of poisoning the living by the noxious effluvia of decomposition; here the vegetable growths will both absorb the *miasmata* and attract the living to renew upon the green sod, and under the shade of trees, the moral influences produced by an association with the grave; and here so long as the affection of the living shall survive to cherish the memory of the dead will even their dust remain a sacred deposit, and its repose be religiously guarded.

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SANITARY REPORT

ON

INTERMENTS IN TOWNS.

To the Right Hon. Sir James Graham, Bart.

SIR,

IN compliance with the request which I have had the honour to receive from you, that I would examine the evidence on the practice of interment, and the means of its improvement, and prepare for consideration a Report thereon, I now submit the facts and conclusions following:—

It has been remarked, as a defect in the General Report on the evidence as to the sanitary condition of the labouring population, that it did not comprise any examination of the evidence as to the effects produced on the public health, by the practice of interring the dead amidst the habitations of the town population. I wish here to explain that the omission arose from the subject being too great in its extent, and too special in its nature, to allow of the completion at that time, of any satisfactory investigation in relation to it even if it had not then been under examination by a Committee of the House of Commons, whose Report is now before the public.

To obtain the information on which the following report is founded, I have consulted, as extensively as the time allowed and my opportunities would permit, ministers of religion who are called upon to perform funeral rites in the poorer districts: I have made inquiries of persons of the labouring classes, and of secretaries and officers of benefit societies and burial clubs, in the metropolis and in several provincial towns in the United Kingdom, on the practice of interments in relation to those classes, and on the alterations and improvements that would be most in accordance with their feelings: I have questioned persons following the occupation of undertakers, and more especially those who are chiefly engaged in the interment of the dead of the labouring classes, on the improvements which they deem practicable in the modes of performing that service: I have consulted foreigners resident in the metropolis, on the various modes of interment in their own countries: I have examined the chief administrative regulations thereon in Germany, France, and the United States:

and I have consulted several eminent physiologists as to the effects produced on the health of the living, by emanations from human remains in a state of decomposition. I need scarcely premise that the moral as well as the physical facts developed in the course of this inquiry are often exceedingly loathsome; but general conclusions can only be distinctly made out from the various classes of particular facts, and the object being the suggestion of remedies and preventives, it were obviously as unbecoming to yield to disgusts or to evade the examination and calm consideration of these facts, as it would be in the physician or the surgeon, in the performance of his duty with the like object, to shrink from the investigation of the most offensive manifestations of disease.

§ 1. It appears that the necessity of removing interments from the midst of towns is very generally admitted on various considerations, independently of those founded on the presumed injurious effects arising from the practice to the public health. I believe an alteration of the practice is strongly desired by many clergymen of the established church, whose incomes, even with the probable compensation for the loss of burial dues, might be expected to be diminished by the discontinuance of *intra-mural* interments. Exemptions from a general prohibition of such interments are, however, claimed in favour of particular burial-grounds, situate within populous districts, of which grounds it is stated that they are not over-crowded with bodies, and of which it is further alleged that they have not been known, and cannot be proved, to be injurious to the public health.

The statements as to the innocuousness of particular graveyards are supported by reference to the general testimony of a number of medical witnesses of high professional position, by whom it is alleged that the emanations from decomposing human remains do not produce specific disease, and, further, that they are not generally injurious. The practical consequences of these doctrines extend beyond the present question, and are so important in their effects on the sanitary economy of all towns, as apparently to require that no opportunity should be lost of examining the statements of facts on which they are founded.

The medical evidence of this class has generally been given in answer to complaints made by the public, of the offensiveness, and the danger to health which arises from the practice of dissection in schools of anatomy amidst crowded populations. The chief fact alleged to prove the innocuousness of emanations from the dead is, that professors of anatomy experience no injury from them. Thus, Dr. Warren, of Boston, in a paper cited by M. Parent Duchâtelet, states, that he has been accustomed all his life to dissecting-rooms, in which he has been engaged night and day. "It has sometimes happened to me," he observes, "after having dissected bodies in a state of putrefaction, to have experienced a sort of weakness and the loss of appetite; but the phe-

nomena were never otherwise than transient. During the year 1829, the weather being excessively hot, decomposition advanced with a degree of rapidity such as I have rarely witnessed: at that season the emanations became so irritating, that they paralyzed the hands, producing small pustules and an excessive itching, and yet my general health was in nowise affected."

Again, whilst it is stated by M. Duchâtelet that students who attend the dissecting-rooms are sometimes seriously injured, and even killed by pricks and cuts with the instruments of dissection, yet it is denied that they are subject to any illness from the emanations from the remains "other than a nausea and a dysentery for two or three days at the commencement of their studies." Fevers the students of medicine are confessedly liable to, but he says it is only when they are in attendance on the living patients in the fever wards.

Sir Benjamin Brodie pointed out to me, that from the precautions taken, by the removal of such portions of the viscera as might be in an advanced state of decomposition, and from the ventilation of dissecting-rooms being much improved, the emanations from the bodies dissected are not so great as might be supposed; nevertheless, he observes:—

There is no doubt that there are few persons who during the anatomical season are engaged for many hours daily in a dissecting-room for a considerable time, whose health is not affected in a greater or less degree; and there are some whose health suffers considerably. I have known several young men who have not been able to prosecute their studies in the dissecting-room for more than three or four weeks at a time, without being compelled to leave them and go into the country. The great majority, however, do not suffer to that extent, nor in such a way as to cause interruption to their studies; and, altogether, the evil is not on a sufficiently large scale to attract much notice, even among the students themselves.

A writer on public health, Dr. Dunglison, maintains that "we have no satisfactory proof that malaria ever arises from animal putrefaction singly;" and as evidence of this position he adduces the alleged fact of the numbers of students who pass through their education without injury; yet he admits—

In stating the opinion that putrefaction singly does not occasion malarious disease, we do not mean to affirm that air highly charged with putrid miasmata may not, in some cases, powerfully impress the nervous system so as to induce syncope and high nervous disorder; or that, when such miasmata are absorbed by the lungs in a concentrated state, they may not excite putrid disorders, or dispose the frame to unhealthy erysipelatous affections. On the contrary, experiment seems to have shown that they are deleterious when injected; and cases are detailed in which, when exhaled from the dead body, they have excited serious mischief in those exposed to their action. According to Percy, a Dr. Chambon was required by the Dean of the Faculté de Médecine of Paris to demonstrate the liver and its appendages before the faculty on applying for his license. The decomposition of the subject given him for the demonstration was so far advanced, that Chambon drew the attention of the Dean to it, but he was required to go on. One of the four candidates, Corion, struck by the putrid emanations which escaped from the body as soon as it was opened, fainted, was carried home, and died in seventy hours; another, the celebrated Fourcroy, was attacked with a burning exanthematous eruption; and two others, Laguerenne and Dufresnoy remained a long time

feeble, and the latter never completely recovered. "As for Chambon," says M. Londe, "indignant at the obstinacy of the Dean, he remained firm in his place, finished his lecture in the midst of the Commissioners, who inundated their handkerchiefs with essences, and, doubtless, owed his safety to his cerebral excitement, which during the night, after a slight febrile attack, gave occasion to a profuse cutaneous exhalation."

An eminent surgeon, who expressed to me his belief that no injury resulted from emanations from decomposing remains, for *he* had suffered none, mentioned an instance where he had conducted the post mortem examination of the corpse of a person of celebrity which was in a dreadful state of decomposition, without sustaining any injury; yet he admitted, as a casual incident which did not strike him as militating against the conclusion, that his assistant was immediately after taken ill, and had an exanthematous eruption, and had been compelled to go to the sea side, but had not yet recovered. Another surgeon who had lived for many years near a churchyard in the metropolis, and had never observed any effluvia from it, neither did *he* perceive any effects of such emanations at church or anywhere else; yet he admitted that his wife perceived the openings of vaults when she went to the church to which the graveyard belonged, and after respiring the air there, would say, "they have opened a vault," and on inquiry, the fact proved to be so. He admitted also, that formerly in the school of anatomy which he attended, pupils were sometimes attacked with fever, which was called "the dissecting-room fever," which, since better regulations were adopted, was now unknown.

§ 2. In proof of the position that the emanations from decomposing remains are not injurious to health at any time, reference is commonly made to the statements in the papers of Parent Duchâtelet, wherein he cites instances of the exhumation of bodies in an advanced stage of decomposition without any injurious consequences being experienced by the persons engaged in conducting them.

At the conclusion of this inquiry, and whilst engaged in the preparation of the report, I was favoured by Dr. Forbes with the copy of a report by Dr. V. A. Riecke, of Stuttgart, "On the Influence of Putrefactive Emanations on the Health of Man," &c., in which the medical evidence of this class is closely investigated. In reference to the statements of Parent Duchâtelet on this question, Dr. Riecke observes—

When Parent Duchâtelet appeals to and gives such prominence to the instance of the disinterments from the churchyard of St. Innocens, and states that they took place without any injurious consequences, although at last all precautions in the mode of disinterring were thrown aside, and that it occurred during the hottest season of the year, and therefore that the putrid emanations might be believed to be in their most powerful and injurious state, I would reply to this by asking the simple question, what occasion was there for the disinterment? Parent Duchâtelet maintains complete silence on this point; but to me the following notices appear worthy of attention. In the year 1554, Houlier and Fernel, and in the year 1738, Lemery, Geoffroy, and Hunaud, raised many complaints of this churchyard; and the two first had asserted

that, during the plague, the disease had lingered longest in the neighbourhood of the Cimetière de la Trinité, and that there the greatest number had fallen a sacrifice. In the years 1737 and 1746, the inhabitants of the houses round the churchyard of St. Innocens complained loudly of the revolting stench to which they were exposed. In the year 1755 the matter again came into notice: the inspector who was intrusted with the inquiry, himself saw the vapour rising from a large common grave, and convinced himself of the injurious effects of this vapour on the inhabitants of the neighbouring house.* "Often," says the author of a paper which we have before often alluded to, "the complexions of the young people who remain in this neighbourhood grow pale. Meat sooner becomes putrid there than elsewhere, and many persons cannot get accustomed to these houses." In the year 1779, in a cemetery which yearly received from 2000 to 3000 corpses, they dug an immense common grave near to that part of the cemetery which touches upon the Rue de la Lingerie. The grave was 50 feet deep, and made to receive from 1500 to 1600 bodies. But in February, 1780, the whole of the cellars in the street were no longer fit to use. Candles were extinguished by the air in these cellars; and those who only approached the apertures were immediately seized with the most alarming attacks. The evil was only diminished on the bodies being covered with half a foot of lime, and all further interments forbidden. But even that must have been found insufficient, as, after some years, the great work of disinterring the bodies from this churchyard was determined upon. This undertaking, according to Thouret's report, was carried on from December 1785, to May, 1786; from December, 1786, to February, 1787; and in August and October of the same year; and it is not unimportant to quote this passage, as it clearly shows how little correct Parent Duchâtelet was in his general statement, that those disinterments took place in the hottest seasons of the year. It is very clear that it was exactly the coldest seasons of the year which were chosen for the work; and though in the year 1787 there occurs the exception of the work having been again begun in August, I think it may be assumed that the weather of this month was unusually cold, and it was therefore thought the work might be carried on without injurious effects. It does not, however, appear to have been considered safe to continue the work at that season, since the report goes on to state that the operations were again discontinued in September.

Against those statements of Parent Duchâtelet, as to the innocuousness of the frequent disinterments in Père La Chaise, statements which are supported by the testimony of Orfila and Ollivier, in regard to their experience of disinterments, I would here place positive facts, which are not to be rejected. "I," also remarks Duvergie, "have undertaken judicial disinterments, and must declare that, during one of these disinterments, at which M. Piedagnel was present with me, we were attacked with an illness, although it was conducted under the shade of a tent, through which there was passing a strong current of wind, and although we used chloride of lime in abundance. M. Piedagnel was confined to his room for six weeks." Apparently, Duvergie is not far wrong when he states his opinion that Orfila had allowed himself to be

* According to a memoir on this subject, read at the Royal Academy of Sciences, by M. Cadet de Vaux, in the year 1781, "*Le méphétisme qui s'étoit dégagé d'une des fosses voisines du cimetière, avoit infecté toutes les caves; on comparait aux poisons les plus subtils, à ceux dont les sauvages impregnent leur flèches meurtrières, la terrible activité de cette émanation. Les murs baignés de l'humidité dont elles les pénétroit, pouvoit communiquer, disoit on par le seul attouchement les accidens les plus redoutable.*" See *Mémoires de la Société Royale de Médecine*, tom. viii., p. 242; also *Annales de Chimie*, tom. v. p. 158. As an instance of the state of the cellars around the graveyard, it is stated, that a workman being engaged in one of them put his hand on the wet wall. He was warned that the moisture on the walls was poisonous, and was requested to wash the hand in vinegar. He merely dried his hand on his apron; at the end of three days the whole arm became numb, then the hand and lower arm swelled with great pain, blisters came out on the skin, and the epidermis came off.

misled by his praiseworthy zeal for the more general recognition of the use of disinterments for judicial purposes, to understate the dangers attending them, as doubtless he had used all the precautions during the disinterments which such researches demand; and to these precautions (which Orfila himself recommended) may be attributed the few injurious effects of these disinterments. It, however, deserves mentioning, that, if Orfila did undertake disinterments during the heat of summer, it must have been only very rarely; at least, amongst the numerous special cases which he gives, we find only two which took place in July or August; most of the cases occurred in the coldest season of the year. I cannot refrain from giving, also, the information which Fourcroy gained from the grave-diggers of the churchyard of St. Innocens. Generally they did not seem to rate the danger of displacing the corpses very high: they remarked, however, that some days after the disinterment of the corpses the abdomen would swell, owing to the great development of gas; and that, if an opening forced itself at the navel, or anywhere in the region of the belly, there issued forth the most horribly smelling liquid, and a mephitic gas; and of the latter they had the greatest fear, as it produced sudden insensibility and faintings. Fourcroy wished much to make further researches into the nature of this gas, but he could not find any grave-digger who could be induced by an offered reward to assist him by finding a body which was in a fit state to produce the gas. They stated, that, at a certain distance, this gas only produced a slight giddiness, a feeling of nausea, languor and debility. These attacks lasted several hours, and were followed by loss of appetite, weakness, and trembling. "Is it not very probable," says Fourcroy, "that a poison so terrible that, when in a concentrated state, it produced sudden death, should, even when diluted and diffused through the atmosphere, still possess a power sufficient to produce depression of the nervous energy and an entire disorder of their functions? Let any one witness the terror of these grave-diggers, and also see the cadaverous appearance of the greatest number, and all the other signs of the influence of a slow poison, and they will no longer doubt of the dangerous effects of the air from churchyards on the inmates of neighbouring houses."

After having strenuously asserted the general innocuousness of such emanations, and the absence of foundation for the complaints against the anatomical schools, Parent Duchâtelet concludes by an admission of their offensiveness, and a recommendation in the following terms:—

"Instead of retaining the 'debris' of dissection near the theatres of anatomy, it would certainly be better to remove them every day: but, as that is often impracticable, there ought, on a good system of 'assainissement,' to be considered the mode of retaining them without incurring the risk of suffering from their infection."

After describing the mode of removing the "debris," he concludes—

"Thus will this part of the work be freed from the inconveniences which accompanied and formed one of the widest sources of 'infection,' and of the disgust which were complained of in the theatres of anatomy."

§ 3. The statements of M. Duchâtelet respecting the innocuousness of emanations from decomposing animal and vegetable remains, observed by him at the *chantiers d'equarrissage*, or receptacle for dead horses, and the *depôts de vidange*, or receptacle of night soil, &c., at Montfaucon, near Paris, are cited in this country, and on the continent, as leading evidence to sustain the general doctrine; but as it is with his statements of the direct effects of the emanations from the graveyards, so it is with relation to his

statements as to the effects of similar emanations on the health of the population; the facts appear to have been imperfectly observed by him even in his own field of observation. In the Medical Review, conducted by Dr. Forbes, reference is made to the accounts given by Caillard of the epidemic which occurred in the vicinity of the Canal de l'Ourcq, near Paris, in 1810 and subsequent years:—

In the route from Paris to Pantin (says he), exposed on the one side to the miasmatic emanations of the canal, and on the other to the putrid effluvia of the *voiries*, the diseases were numerous; almost all serious and obstinate. This disastrous effect of the union of putrid effluvia with marsh miasmata, was especially evident in one part of this route, termed the Petit Pont hamlet, inhabited by a currier and a gut-spinner, the putrid waters from whose operations are prevented from escaping by the banks of the canal, and exposed before the draining to the emanations of a large marsh. 'This hamlet was so unhealthy, that of five-and-twenty or thirty inhabitants I visited, about twenty were seriously affected, of whom five died.

In the carefully prepared report on the progress of cholera at Paris, made by the commission of medical men, of which Parent Duchâtelet was a member, it is mentioned, as a singular incident, that in those places where putrid emanations prevailed, "*le cholera ne s'est montré ni plus redoutable ni plus meurtrier que dans autres localities.*" Yet the testimony cited as to this point is that of the Maire, "whose zeal equalled his intelligence," and he alleges the occurrence of the fact of the liability to fevers, which M. Duchâtelet elsewhere denies.

"I have also made some observations which seem to destroy the opinions received at this time, as to the sanitary effect of these kinds of receptacles; for,

"1st. The inhabitants of the houses situated the nearest to the dépôt, and which are sometimes *tormented* with fevers, have never felt any indisposition."

§ 4. To prove the innocuousness of emanations from human remains on the general health, evidence of another class is adduced, consisting of instances of persons acting as keepers of dissecting-rooms, and grave-diggers, and the undertakers' men, who, it is stated, have pursued their occupations for long periods, and have nevertheless maintained robust health.

The examination of persons engaged in processes exposed to miasma from decomposing animal remains in general, only shows that habit, combined with associations of profit, often prevents or blunts the perceptions of the most offensive remains. Men with shrunken figures, and the appearance of premature age, and a peculiar cadaverous aspect, have attended as witnesses to attest their own perfectly sound condition, as evidence of the salubrity of their particular occupations. Generally, however, men with robust figures and the hue of health are singled out and presented as examples of the general innocuousness of the offensive miasma generated in the process in which they are engaged. Professor Owen mentions an instance of a witness of this class, a very robust man, the keeper of a dissecting-room, who appeared to be

in florid health (which however proved not to be so sound as he himself conceived), who professed perfect unconsciousness of having sustained any injury from the occupation, and there was no reason to doubt that he really was unconscious of having sustained or observed any; but it turned out, on inquiry, that he had always had the most offensive and dangerous work done by an inferior assistant; and that within his time he had had no less than eight assistants, and that every one had died, and some of these had been dissected in the theatre where they had served. So, frequently, the sextons of graveyards, who are robust men, attest the salubrity of the place; but on examining the inferiors, the grave-diggers, it appears, where there is much to do, and even in some of the new cemeteries, that as a class they are unhealthy and cadaverous, and notwithstanding precautions, often suffer severely on re-opening graves, and that their lives are frequently cut short by the work.* There are very florid and robust undertakers; but, as a class, and with all the precautions they use, they are unhealthy; and a master undertaker, of considerable business in the metropolis, states, that "in nine cases out of ten the undertaker who has much to do with the corpse is a person of cadaverous hue, and you may almost always tell him whenever you see him." Fellmongers, tanners, or the workmen employed in the preparation of hides, have been instanced by several medical writers as a class who, being exposed to emanations from the skins when in a state of putrefaction, enjoy good health; but it appears that all the workmen are not engaged in the process when the skins are in that state, and that those of them who are, as a class, do experience the common consequences. The whole class of butchers, who are much in the open air, and have very active exercise, and who are generally robust and have florid health, are commonly mentioned as instances in proof of the innocuousness of the emanations from the remains in slaughter-houses; but master butchers admit that the men exclusively engaged in the slaughter-houses, in which perfect cleanliness and due ventilation are neglected, are of a cadaverous aspect, and suffer proportionately in their health.

Medical papers have been written in this country and on the continent to show that the exposure of workmen to putrid emanations in the employment of sewer-cleansing has no effect on the general health; and when the employers of the labourers engaged in such occupations are questioned on the subject, their general reply is, that their men "have nothing the matter with them:" yet when the *class* of men who have been engaged in the work during any length of time are assembled; when they are compared with classes of men of the same age and country, and

* Vide also, *Traité des Maladies des Artisans*, par Patissier, d'après Ramazzini, 8vo. Paris, 1822, p. 151, sur les Fossoyeurs: "Le sort des fossoyeurs est très déplorable, leur face est livide, leur aspect triste: je n'en ai vu aucun devenir vieux." Also pp. 108-9, 137, 144.

of the like periods of service in other employments free from such emanations, or still more when they are compared with men of the same age coming from the purer atmosphere of a rural district, the fallacy is visible in the class, in their more pallid and shrunken aspect—the evidence of languid circulation and reduced “tone,” and even of vitality—and there is then little doubt of the approximation given me by an engineer who has observed different classes of workmen being correct, that employment under such a mephitic influence as that in question ordinarily entails a loss of at least one-third of the natural duration of life and working ability.

The usual comment of the employers on the admitted facts of the ill-health and general brevity of life of the inferior workmen engaged in such occupations is, “But they drink—they are a drunken set;” and such appears frequently, yet by no means invariably, to be the case. On further examination it appears that the exposure to the emanations is productive of nervous depression, which is constantly urged by the workmen as necessitating the stimulus of spirituous or fermented liquors. The inference that the whole of the effects are ascribable to the habitual indulgence in such stimuli is rebutted by the facts elicited on examination of other classes of workmen who indulge as much or more, but who nevertheless enjoy better health, and a much greater average duration of life. It is apt to be overlooked that the weakly rarely engage in such occupations, or soon quit them: and that, in general, the men are of the most robust classes, and have high wages and rather short hours of work, as well as stimulating food. A French physician, M. Labarraque, states in respect to the tanners, that notwithstanding the constant exposure to the emanations from putrid fermentations, it has not been “remarked” of the workmen of this class that they are more subject to illness than others. A tanner, in a manual written for the use of the trade, without admitting the correctness of this statement, observes: “Whatever may be the opinion of M. Labarraque on this point, we do not hesitate to declare the fact that this species of labour cannot be borne by weakly, scrofulous, or lymphatic subjects.”*

§ 5. So far as observations have been made on the point (and the more those reported upon it are scrutinized, the less trustworthy they appear to be), workmen so exposed do not appear to be peculiarly subject to epidemics; many, indeed, appear to be exempted from them to such an extent as to raise a presumption that such emanations have on those “acclimated” to them an unexplained preservative effect analogous to vaccination. That one miasma may exclude, or neutralize, or modify the influence of another, would appear to be *primâ facie* probable. But it is now becoming more extensively apparent that the same

* Manuel du Tanneur et Corroyeur. Paris, 1833, p. 325.

cause is productive of very different effects on different persons, and on the same persons at different times; as in the case mentioned by Dr. Arnott of the school badly drained at Clarendon Square, Somers' Town, where every year, while the nuisance was at its height, and until it was removed by drainage, the malaria caused some remarkable form of disease; one year, extraordinary nervous affection, exhibiting rigid spasms, and then convulsions of the limbs, such as occur on taking various poisons into the stomach; another year, typhoid fever; in another, ophthalmia; in another, extraordinary constipation of the bowels, affecting similar numbers of the pupils. Such cases as the one before cited with respect to the *depôt* for animal matter in Paris, where the workmen suffered very little, whilst the people living near the *depôt* were "tormented with fevers," are common. The effects of such miasma are manifested immediately on all surrounding human life (and there is evidence to believe they are manifest in their degree on animal life*), in proportion to the relative strength of the destructive agents and the relative strength or weakness of the beings exposed to them; the effects are seen first on infants; then on children in the order of their age and strength; then on females, or on the sickly, the aged, and feeble; last of all, on the robust workmen, and on them it appears on those parts of the body that have been previously weakened by excess or by illness. Whilst M. Parent Duchâtelet was looking for immediate appearances of acute disease on the robust workmen living amidst the decomposing animal effluvium of the Mont-faucon, I have the authority of Dr. Henry Bennett for stating that he might have found that the influence of that effluvium was ob-

* In the course of some inquiries which I made with Professor Owen, when examining a slaughterman as to the effects of the effluvia of animal remains on himself and family, some other facts were elicited illustrative of the effects of such effluvia on still more delicate life. The man had lived in Bear-yard, near Clare-market, which was exposed to the combined effluvia from a slaughter-house and a tripe factory. He was a bird-fancier, but he found that he could not rear his birds in this place. He had known a bird fresh caught in summer-time die there in a week. He particularly noted as having a fatal influence on the birds, the stench raised by boiling down the fat from the tripe offal. He said, "You may hang the eage out of the garret window in any house round Bear-yard, and if it be a fresh bird, it will be dead in a week." He had previously lived for a time in the same neighbourhood in a room over a crowded burial-ground in Portugal street; at times in the morning he had seen a mist rise from the ground, and the smell was offensive. That place was equally fatal to his birds. He had removed to another dwelling in Vere street, Clare-market, which is beyond the smells from those particular places, and he was now enabled to keep his birds. In town, however, the ordinary singing-birds did not, usually, live more than about 18 months; in cages in the country, such birds were known to live as long as nine years or more on the same food. When he particularly wished to preserve a pet bird, he sent it for a time into the country; and by repeating this removal he preserved them much longer. The fact of the pernicious effect of offensive smells on the small graminivorous birds, and the short duration of their life in close rooms and districts, was attested by a bird-dealer. In respect to cattle, the slaughterman gave decided reasons for the conclusion, that whilst in the slaughter-house they lost their appetites and refused food from the effect of the effluvium of the place, and not, as was popularly supposed, from any presentiment of their impending fate. *Vide* General Sanitary Report, p. 103, note, and p. 106.

servable on the sick at half a mile distant. X "When I was house-surgeon at St. Louis," says Dr. Bennett, "I several times remarked, that whenever the wind was from the direction of the Montfaucon, the wounds and sores under my care assumed a foul aspect. M. Jobert, the surgeon of the hospital, has told me that he has repeatedly seen hospital gangrene manifest itself in the wards apparently under the same influence. It is a fact known to all who are acquainted with St. Louis, that the above malady is more frequent at that hospital than at any other in Paris, although it is the most airy and least crowded of any. This, I think, can only be attributed to the proximity of the Montfaucon. Indeed, when the wind blows from that direction, which it often does for several months in the year, the effluvium is most odious." As an instance of a similar influence of another species of effluvium, not observed by the healthy inhabitants of a district, it is stated that at a large infirmary in this country, when the piece of ornamental water, which was formerly stagnant in front of the edifice, had a greenish scum upon it, some descriptions of surgical operations were not so successful as at other times, and a flow of fresh water has been introduced into the reservoir to prevent the miasma.

The immediate contrasts of the apparent immunity of adults to conspicuous attacks of epidemics, may perhaps account for the persuasion which masters and workmen sometimes express, that they owe an immunity from epidemics to their occupation, and that the stench to which they are exposed actually "purify" the atmosphere. Numbers of such witnesses have heretofore been ready to attest their conviction of the preservative effect, and even the positive advantages to health, of the effluvia generated by the decomposition of animal or of vegetable matter, or of the fumes of minerals, of smoke, soot, and coal gas. But though they do not peculiarly suffer from epidemics, it is usually found that they are not exempted. In a recent return of the state of health of some workmen engaged in cleansing sewers, whilst it appeared that very few had suffered any attack from fever, nearly all suffered bowel attacks and violent intestinal derangement. If the effects of such emanations invariably appeared in the form of acute disease, large masses of the population who have lived under their influence must have been exterminated. In general the poison appears only to be generated in a sufficient degree of intensity to create acute disease under such a conjunction of circumstances, as a degree of moisture sufficient to facilitate decomposition, a hot sun, a stagnant atmosphere, and a languid population. The injurious effects of diluted emanations are constantly traceable, not in constitutional disturbance at any one time; they have their effect even on the strong, perceptible over a space of time in a general depression of health and a shortened period of existence. This or that individual may have the florid hue of health, and may live under constant exposure to noxious influences

to his sixtieth or his seventieth year; but had he not been so exposed he might have lived in equal or greater vigour to his eightieth or his ninetieth year. A cause common to a whole class is often, however, not manifest in particular individuals, but is yet visible in the pallor and the reduced sum of vitality of the whole class, or in the average duration of life in that class as compared with the average duration of life of another class similarly situated, in all respects except in the exposure to that one cause.* The effects of a cause of depression on a class are sometimes visible in the greater fatality of common accidents. An excess of mortality to a class is almost always found, on examination, to be traceable to an adequate cause. From the external circumstances of a class of the population, a confident expectation may be formed of the sum of vitality of the class, though nothing could be separately predicated of a single individual of it. If the former vulgar notions were correct as to the salubrity of the stench which prevail in towns, the separate as well as the combined results of these several supposed causes of salubrity must be to expel fevers and epidemics from the most crowded manufacturing districts, and to advance the general health of the inhabitants above that of the poorer rural population; but all such fallacies are dissipated by the dreadful facts on the face of the mortuary records showing a frequency of deaths, and a reduction of the mean duration of life, in proportion to the constancy and the intensity of the combined operation of these same causes.†

§ 6. The observations of the effects of such emanations on the general health of classes of human beings have been corroborated by experiments on animals.

§ 7. Another doctrine more extensively entertained than that above noticed, is, that although putrid emanations are productive of injury, they are not productive of specific disease, such as typhus. The medical witnesses say, that they were exposed to such emanations in dissecting-rooms, where bodies of persons who have died of small-pox, typhus, scarlatina, and every species of disease, are brought; that they pursued their studies in such

* On the evidence of individual cases the innocuousness of many poisons and diseases might be proved. Individuals are sometimes found to resist inoculation. It is a singular, and as yet unexplained fact, that centenarians are often found in the greatest proportion in times and places where the average duration of life of the whole population is very low. It has been shown from an accurate registration of centuries in Geneva, that as the average duration of life amongst the whole community advanced, the proportion of extreme cases of centenarians diminished. According to the bills of mortality there were nearly three times as many centenarians in London a century ago as at present. Out of 141,720 deaths within the bills of mortality during the five years ended 1742, the deaths of 58 persons alone of 100 years and upwards of age are recorded; whilst out of 139,876 deaths which occurred in the metropolis as returned by the registrar-general, during the three years which ended 30th June, 1841, only 22 deaths of 100 years of age and upwards are recorded. The average age of death of all who died was then 24 years; it is now, judging from an enumeration made from the returns of 1839, about 27 years; and there appears to have been a considerable improvement in all periods of life up to 90 years.

† Vide Appendix of the district returns of the Mortuary Registration.

places, and were unaware of typhus or other disease having been taken by the students in them, though that disease was frequently caught by students whilst attending the living in the fever wards.*

The strongest of this class of negative evidence appears to be that of undertakers, all of whom that I have seen state that neither specific disease nor the propagation of any disease was known to occur amongst them, from their employment. Neither the men who handle, or who "coffin," the remains; nor the barbers who are called in to shave the corpses of the adult males; nor the bearers of the coffins, although, when the remains are in an advanced state of decomposition, the liquid matter from the corpse frequently escapes from the coffin, and runs down over their clothes, are observed to catch any specific disease from it, either in their noviciate, or at any other time. When decomposition is very far advanced, and the smell is very offensive, the men engaged in putting the corpse into the coffin smoke tobacco; and all have recourse to the stimulus of spirituous liquor. But it is not known that by their infected clothes they ever propagate specific disease in their families, or elsewhere. Neither does this appear to be observed amongst the medical men themselves.†

§ 8. On the other hand, the undertakers observe such instances, as will be stated in their own words in a subsequent part of the report, where others have caught fever and small-pox, apparently from the remains of the dead, and they mention instances of persons coming from a distance to attend funerals, who have shortly afterwards become affected with the disease of which the person buried had died. Of the undertakers it is observed, that being adults, they were likely to have had small-pox. Dr. Williams, in a work stated to be of good authority, on the effects of morbid poisons, relates the case of four students infected with small-pox by the dead body of a man who had died of this disease, that

* In the medical profession examples are not rare of the attainment of extreme old age; yet as a class they bear the visible marks of health below the average. The registration of one year may be an imperfect index; but the mortuary registration for the year 1839 having been examined, to ascertain what was the average age of death of persons of the three professions, it appears that the average age of the clergymen who died in London during that year was 59, of the legal profession 50, and of the medical profession 45. Only one medical student was included in the registration; had the deaths of those who died in their noviciate been included, the average age of death of the medical profession would have been much lower.

† An instance in exception of a barber having caught fever is subsequently stated.

‡ Two days in the week the London Fever Hospital is open to the friends of the patients, who often spend a considerable time in the wards, sometimes sitting on the beds of the sick; yet these visitors never take fever themselves, nor are they ever known to convey it by their clothes to persons out of the hospital. In like manner the persons employed to convey the clothes of the fever-patients from the wards of the hospital do not take fever, nor is there any evidence whatever that typhus fever is, or can be, propagated merely by the clothes; yet it is remarkable that the laundresses who wash the clothes, which often contain excrementitious matters from the patients, or from the dead, of an amount perceptible to the senses, rarely if ever escape fever. It is inferred, that in this case the poison is by the heat put in a state of vapour, which is inhaled, and being sufficient in quantity, produces the disease.

was brought into the Windmill-street Theatre, in London, for dissection. One of them saw the body, but did not approach it; another was near it, but did not touch it; a third, accustomed to make sketches from dead bodies, saw this subject, but did not touch it; the fourth alone touched it with both his hands; yet all the four caught the disease. Sir Benjamin Brodie mentions cases which occurred within his own knowledge, of pupils who caught small-pox after exposure to the emanations in the dissecting-room from the bodies of persons who had died of that disease.

Dr. Copeland, in his evidence before the Committee of the House of Commons, adduced the following remarkable case, stated to be of fever communicated after death:—

About two years ago (says he) I was called, in the course of my profession, to see a gentleman, advanced in life, well known to many members in this house and intimately known to the Speaker. This gentleman one Sunday went into a dissenting chapel, where the principal part of the hearers, as they died, were buried in the ground or vaults underneath. I was called to him on Tuesday evening, and I found him labouring under symptoms of malignant fever; either on that visit or the visit immediately following, on questioning him on the circumstances which could have given rise to this very malignant form of fever, for it was then so malignant that its fatal issue was evident, he said that he had gone on the Sunday before (this being on the Tuesday afternoon) to this dissenting chapel, and on going up the steps to the chapel he felt a rush of foul air issuing from the grated openings existing on each side of the steps; the effect upon him was instantaneous; it produced a feeling of sinking, with nausea, and so great debility, that he scarcely could get into the chapel. He remained a short time, and finding this feeling increase, he went out, went home, was obliged to go to bed, and there he remained. When I saw him he had, up to the time of my ascertaining the origin of his complaint, slept with his wife; he died eight days afterwards; his wife caught the disease and died in eight days also, having experienced the same symptoms. These two instances illustrated the form of fever arising from those particular causes. Means of counteraction were used, and the fever did not extend to any other member of the family.

Assuming that that individual had gone into a crowded hospital with that fever, it probably would have become a contagious fever. The disease would have propagated itself most likely to others, provided those others exposed to the infection were predisposed to the infection, or if the apartments where they were confined were not fully ventilated, but in most cases where the emanations from the sick are duly diluted by fresh air, they are rendered innocuous. It is rarely that I have found the effects from dead animal matter so very decisive as in this case, because in the usual circumstances of burying in towns the fetid or foul air exhaled from the dead is generally so diluted and scattered by the wind, as to produce only a general ill effect upon those predisposed; it affects the health of the community by lowering the vital powers, weakening the digestive processes, but without producing any prominent or specific disease.

Mr. Barnett, surgeon, one of the medical officers of the Stepney Union, who has observed the symptoms observable in those persons who are exposed to the emanations from a crowded graveyard, thus describes them:—

They are characterized by more or less disturbance of the whole system, with evident depression of the vital force, as evinced throughout the vascular and nervous systems, by the feeble action of the heart and arteries, and lowness of the spirits, &c. These maladies, I doubt not, if surrounded by other

causes, would terminate in fever of the worst description. The cleanliness, &c., of the surrounding neighbourhood, perhaps, prevents this actually taking place.

Some years since a vault was opened in the churchyard (Stepney), and shortly after one of the coffins contained therein burst with so loud a report that hundreds flocked to the place to ascertain the cause. So intense was the poisonous nature of the effluvia arising therefrom, that a great number were attacked with sudden sickness and fainting, many of whom were a considerable period before they recovered their health.

The vaults and burial-ground attached to Brunswick chapel, Limehouse, are much crowded with dead, and from the accounts of individuals residing in the adjoining houses, it would appear that the stench arising therefrom, particularly when a grave happens to be opened during the summer months, is most noxious. In one case it is described to have produced instant nausea and vomiting, and attacks of illness are frequently imputed to it. Some say they have never had a day's good health since they have resided so near the chapel-ground, which, I may remark, is about five feet above the level of the surrounding yards, and very muddy—so much so, that pumps are frequently used to expel the water from the vaults into the streets.

The bursting of leaden coffins in the vaults of cemeteries, unless they are watched and "tapped" to allow the mephitic vapour to escape, appears to be not unfrequent. In cases of rapid decomposition, such instances occur in private houses before the entombment. An undertaker of considerable experience states:—

"I have known coffins to explode, like the report of a small gun, in the house. I was once called up at midnight by the people, who were in great alarm, and who stated that the coffin had burst in the night, as they described it, with 'a report like the report of a cannon.' On proceeding to the house I found in that case, which was one of dropsy, very rapid decomposition had occurred, and the lead was forced up. Two other cases have occurred within my experience of coffins bursting in this manner. I have heard of similar cases from other undertakers. The bursting of lead coffins without noise is more frequent. Of course it is never told to the family unless they have heard it, as they would attribute the bursting to some defective construction of the coffins."

The occurrence of cases of instant death to grave-diggers, from accidentally inhaling the concentrated miasma which escapes from coffins, is undeniable. Slower deaths from exposure to such miasma are designated as "low fevers," and whether or not the constitutional disturbances attendant on the exposure to the influence of such miasma be or not the true typhus, it suffices as a case requiring a remedy, that the exposure to that influence is apt to produce grievous and fatal injuries amongst the public.

§ 9. Undertakers state that they sometimes experience, in particularly crowded graveyards, a sensation of faintness and nausea without perceiving any offensive smell. Dr. Riecke appears to conclude from various instances which are given, that emanations from putrid remains operate in two ways,—one set of effects being produced through the lungs by impurity of the air from the mixture of irrespirable gases; the other set, through the olfactory nerves by powerful, penetrating, and offensive smells. On the whole, the evidence tends to establish the general conclusion that offensive smells are true warnings of sanitary evils to the popula-

tion. The fact of the general offensiveness of such emanations is adduced by Dr. Riccke also as evidence of their injurious quality.

Another circumstance which must awaken in us distrust of putrid emanations, is the powerful impression they make on the sense of smell. It certainly cannot be far from the truth to call the organ of smell the truest sentinel of the human frame. "Many animals," observes Rudolphi, "are entirely dependent on their sense of smell for finding out food that is not injurious; where their smell is injured they are easily deceived, and have often fallen a sacrifice to the consequent mistakes." Amongst all known smells, there is, perhaps, no one which is so universally, and to such a degree revolting to man, as the smell of animal decomposition. The roughest savage, as well as the most civilized European, fly with equal disgust from the place where the air is infected by it. If an instinct ever can be traced in man, certainly it is in the present case: and is instinct a superfluous monitor exactly in this one case? Can instinct mislead just in this one circumstance? Can it ever be, that the air which fills us with the greatest disgust, is the finest elixir of life, as Dumoullins had the boldness to maintain in one of his official reports. Hippolyte Cloquet, in his *Osphrestologie* has attempted to throw some light on the effect of smell on the human frame, and though we must entirely disregard many of the anecdotes which he has blended into his inquiry, yet the result remains firmly proved that odours in general exert a very powerful influence on the health of men, and that all very acutely impressing smells are highly to be suspected of possessing injurious properties.

§ 10. I beg leave on this particular topic to submit the facts and opinions contained in communications from two gentlemen who have paid close and comprehensive attention to the subject.

Dr. Southwood Smith, who, as physician to the London Fever Hospital, and from having been engaged in several investigations as to the effects of putrid emanations on the public health, must have had extensive means of observation, states as follows:—

1. That the introduction of dead animal matter under certain conditions into the living body is capable of producing disease, and even death, is universally known and admitted. This morbid animal matter may be the product either of secretion during life or of decomposition after death. Familiar instances of morbid animal matter, the result of secretion during life, are the poisons of small-pox and cow-pox, and the vitiated fluids formed in certain acute diseases, such as acute inflammations, and particularly of the membranes that line the chest and abdomen. On the examination of the body a short time after death from such inflammations, the fluids are found so extremely acrid, that even when the skin is entirely sound, they make the hands of the examiner smart; and if there should happen to be the slightest scratch on the finger, or the minutest point not covered by cuticle, violent inflammation is often produced, ending, sometimes within forty-eight hours, in death. It is remarkable, and it is a proof that in these cases the poison absorbed is not putrid matter, that the most dangerous period for the examination of the bodies of persons who die of such diseases is from four to five hours after the fatal event, and while the body is yet warm.

That the direct introduction into the system of decomposing and putrescent animal matter is capable of producing fevers and inflammations, the intensity and malignity of which may be varied at will, according to the putrescency of the matter and the quantity of it that is introduced, is proved by numerous experiments on animals; while the instances in which human beings are seized with severe and fatal affections from the application of the fluids of a dead animal body to a wounded, punctured, or abraded surface, sometimes when the aperture is so minute as to be invisible without the aid of a lens, are of daily occurrence. Though this fact is now well known, and is among

the few that are disputed by no one, it may be worth while to cite a few examples of it, as specimens of the manner in which the poison of animal matter, when absorbed in this way, acts; a volume might be filled with similar instances.

The following case is recorded by Sir Astley Cooper:—Mr. Elcock, student of anatomy, slightly punctured his finger in opening the body of a hospital patient, about twelve o'clock at noon, and in the evening of the same day, finding the wound painful, showed it to Sir Astley Cooper, after his surgical lecture. During the night the pain increased to extremity, and symptoms of high constitutional irritation presented themselves on the ensuing morning. No trace of inflammation was apparent beyond a slight redness of the spot at which the wound had been inflicted, which was a mere puncture. In the evening he was visited by Dr. Babington, in conjunction with Dr. Haighton and Sir Astley Cooper; still no local change was to be discovered, but the nervous system was agitated in a most violent and alarming degree, the symptoms nearly resembling the universal excitation of hydrophobia, and in this state he expired, within the period of forty-eight hours from the injury.

The late Dr. Pett, of Hackney, being present at the examination of the body of a lady who had died of peritoneal inflammation after her confinement, handled the diseased parts. In the evening of the same day, while at a party, he felt some pain in one of his fingers, on which there was a slight blush, but no wound was visible at that time. The pain increasing, the finger was examined in a stronger light, when, by the aid of a lens, a minute opening in the cuticle was observed. During the night the pain increased to agony, and in the morning his appearance was extremely altered; his countenance was suffused with redness, his eyes were hollow and ferretly; there was a peculiarity in his breathing, which never left him during his illness; his manner, usually gay and playful, was now torpid, like that of a person who had taken an excessive dose of opium; he described himself as having suffered intensely, and said that he was completely knocked down and had not the strength of a child, and he sunk exhausted on the fifth day from the examination of the body.

George Higginbottom, an undertaker, was employed to remove in a shell the corpse of a woman who had died of typhus fever in the London Fever Hospital. In conveying the body from the shell into the coffin, he observed that his left hand was besmeared with a moisture which had oozed from it. He had a recent scratch on his thumb. The following morning this scratch was inflamed; in the evening of the same day he was attacked with a cold shivering and pain in his head and limbs, followed the next by other symptoms of severe fever; on the fourth day there was soreness in the top of the shoulder and fulness in the axilla; on the fifth the breast became swollen and efflorescent; on the seventh delirium supervened, succeeded by extreme prostration and coma, and death took place on the tenth day.

A lady in the country received a basket of fish from London which had become putrid on the road. In opening the basket she pricked her finger, and she slightly handled the fish. On the evening of this day inflammation came on in the finger, followed by such severe constitutional symptoms as to endanger life, and it was six months before the effects of this wound subsided and her health was restored.

Among many other cases, Mr. Travers gives the following, as displaying well the minor degrees of irritation, local and constitutional, to which cooks and others, in handling putrid animal matter with chapped and scratched fingers, are exposed:—A cook-maid practised herself on a stale hare, for the purpose of learning the mode of boning them, in spite of being strongly cautioned against it. A few days afterwards two slight scratches, which she remembered to have received at the time, began to inflame; one was situated on the fore-finger and the other on the ring-finger. This inflammation was accompanied with a dull pain and feeling of numbness, and an occasional darting pain along the inside of the fore-arm. The next day she was attacked with excruciating pain at the point of the fore-finger, which

throbbed so violently as to give her the sensation of its being about to burst at every pulsation. The following morning constitutional symptoms came on; her tongue was white and dry; she had no appetite; there was great dejection of spirits and languor, and a weak and unsteady pulse. After suffering greatly from severe pain in the finger, hand, and arm, and great constitutional derangement and debility, the local inflammation disappeared in about three weeks, and she then began to recover her appetite and strength.

2. It is proved by indubitable evidence that this morbid matter is as capable of entering the system when minute particles of it are diffused in the atmosphere as when it is directly introduced into the blood-vessels by a wound. When diffused in the air, these noxious particles are conveyed into the system through the thin and delicate walls of the air vesicles of the lungs in the act of respiration. The mode in which the air vesicles are formed and disposed is such as to give to the human lungs an almost incredible extent of absorbing surface, while at every point of this surface there is a vascular tube ready to receive any substance imbibed by it, and to carry it at once into the current of the circulation. Hence the instantaneousness and the dreadful energy with which certain poisons act upon the system when brought into contact with the pulmonary surface. A single inspiration of the concentrated prussic acid, for example, is capable of killing with the rapidity of a stroke of lightning. So rapidly does this poison affect the system, and so deadly is its nature, that more than one physiologist has lost his life by incautiously inhaling it while using it for the purpose of experiment. If the nose of an animal be slowly passed over a bottle containing this poison, and the animal happen to inspire during the moment of the passage, it drops down dead instantaneously, just as when the poison is applied in the form of a liquid to the tongue or the stomach. On the other hand, the vapour of chlorine possesses the property of arresting the poisonous effects of prussic acid; and hence, when an animal is all but dead from the effects of this acid, it is sometimes suddenly restored to life by holding its mouth over the vapour of chlorine.

During every moment of life, in natural respiration, a portion of the air of the atmosphere passes through the air vesicles of the lungs into the blood, while a quantity of carbonic acid gas is given off from the blood, and is transmitted through the walls of these vesicles into the atmosphere. Now that substances mixed with or suspended in atmospheric air may be conveyed with it to the lungs and immediately enter into the circulating mass, any one may satisfy himself merely by passing through a recently painted chamber. The vapour of turpentine diffused through the chamber, is transmitted to the lungs with the air which is breathed, and passing into the current of the circulation through the walls of the air vesicles, exhibits its effects in some of the fluid excretions of the body, even more rapidly than if it had been taken into the stomach.

Facts such as these help us to understand the production and propagation of disease through the medium of an infected atmosphere, whether on a large scale, as in the case of an epidemic which rapidly extends over a nation or a continent, or on a small scale, in the sick-chamber, the dissecting-room, the church, and the churchyard.

Thus it is universally known that, when the atmosphere is infected with the matter of small-pox, this disease is produced with the same and even with greater certainty than when the matter of small-pox is introduced by the lancet directly into a blood-vessel in inoculation.

It is equally well known that, when the air is infected by particles of decomposing vegetable and animal matter, fevers are produced of various types and different degrees of intensity; that the exhalations arising from marshes, bogs, and other uncultivated and undrained places, constitute a poison chiefly of a vegetable nature, which produces principally fevers of an intermittent or remittent type; and that exhalations accumulated in close, ill-ventilated, and crowded apartments in the confined situations of densely-populated cities, where little attention is paid to the removal of putrefying and excrementitious matters, constitute a poison chiefly of an animal nature, which produces con-

tinued fever of the typhoid character. There are situations in which these putrefying matters, aided by heat and other peculiarities of climate, generate a poison so intense and deadly, that a single inspiration of the air in which they are diffused is capable of producing almost instantaneous death; and there are other situations in which a less highly concentrated poison accumulates, the inspiration of which for a few minutes produces a fever capable of destroying life in from two to twelve hours. In dirty and neglected ships, in damp, crowded, and filthy gaols, in the crowded wards of ill-ventilated hospitals, filled with persons labouring under malignant surgical diseases or bad forms of fever, an atmosphere is generated which cannot be breathed long, even by the most healthy and robust, without producing highly dangerous fever.

3. The evidence is just as indubitable that exhalations arise from the bodies of the dead, which are capable of producing disease and death. Many instances are recorded of the communication of small-pox from the corpse of a person who has died of small-pox. This has happened not only in the dwelling-house before interment, but even in the dissecting-room. Some years ago five students of anatomy, at the Webb street school, Southwark, who were pursuing their studies under Mr. Grainger, were seized with small-pox, communicated from a subject on the dissecting-table, though it does not appear that all who were attacked were actually engaged in dissecting this body. One of these young men died. There is reason to believe that emanations from the bodies of persons who have died of other forms of fever have proved injurious and even fatal to individuals who have been much in the same room with the corpse.

The exhalations arising from dead bodies in the dissecting-room are in general so much diluted by admixture with atmospheric air, through the ventilation which is kept up, that they do not commonly affect the health in a very striking or marked manner; and, by great attention to ventilation, it is no doubt possible to pursue the study of anatomy with tolerable impunity. Yet few teachers of anatomy deny that without this precaution this pursuit is very apt to injure the health, and that, with all the precaution that can be taken it sometimes produces such a degree of diarrhœa, and at other times such a general derangement of the digestive organs, as imperatively to require an absence for a time from the dissecting-room and a residence in the pure air of the country. The same statements are uniformly made by the professors of veterinary anatomy in this country. The result of inquiries which I have personally made into the state of the health of persons licensed to slaughter horses, called knackers, is, that though they maintain their health apparently unimpaired for some time, yet that after a time the functions of the nutritive organs become impaired, they begin to emaciate, and present a cadaverous appearance, slight wounds fester and become difficult to heal, and that upon the whole they are a short-lived race.

The exhalations arising from dead bodies interred in the vaults of churches, and in churchyards, are also so much diluted with the air of the atmosphere, that they do not commonly affect the health in so immediate and direct a manner as plainly to indicate the source of these noxious influences. It is only when some accidental circumstances have favoured their accumulation or concentration in an unusual degree, that the effects become so sensible as obviously to declare their cause. Every now and then, however, such a concurrence of circumstances does happen, of which there are many instances on record; but it may suffice for the present to mention one, the particulars of which I have received from a gentleman who is known to me, and on the accuracy of whose statements I can rely.

Mr. Hutchinson, surgeon, Farringdon street, was called on Monday morning, the 15th March, 1841, to attend a girl, aged fourteen, who was labouring under typhus fever of a highly malignant character. This girl was the daughter of a pew-opener in one of the large city churches, situated in the centre of a small burial-ground, which had been used for the interment of the dead for centuries, the ground of which was raised much above its natural

level, and was saturated with the remains of the bodies of the dead. There were vaults beneath the church, in which it was still the custom, as it had long been, to bury the dead. The girl in question had recently returned from the country, where she had been at school. On the preceding Friday, that is, on the fourth day before Mr. Hutchinson saw her, she had assisted her mother during three hours, and on the Saturday during one hour, in shaking and cleansing the matting of the aisles and pews of the church. The mother stated, that this work was generally done once in six weeks; that the dust and effluvia which arose, always had a peculiarly fœtid and offensive odour, very unlike the dust which collects in private houses; that it invariably made her (the mother) ill for at least a day afterwards; and that it used to make the grandmother of the present patient so unwell, that she was compelled to hire a person to perform this part of her duty. On the afternoon of the same day on which the young person now ill had been engaged in her employment, she was seized with shivering, severe pain in the head, back, and limbs, and other symptoms of commencing fever. On the following day all these symptoms were aggravated, and in two days afterwards, when Mr. Hutchinson first saw her, malignant fever was fully developed, the skin being burning hot, the tongue dry and covered with a dark brown fur, the thirst urgent, the pain of the head, back, and extremities severe, attended with hurried and oppressed breathing, great restlessness and prostration, anxiety of countenance, low muttering delirium, and a pulse of one hundred and thirty in the minute.

In this case it is probable that particles of noxious animal matter progressively accumulated in the matting during the intervals between the cleansing of it; and that being set free by this operation, and diffused in the atmosphere, while they were powerful enough always sensibly to effect even those who were accustomed to inhale them, were sufficiently concentrated to produce actual fever in one wholly unaccustomed to them, and rendered increasingly susceptible to their influence by recent residence in the pure air of the country; for it is remarkable that miasms sometimes act with the greatest intensity on those who habitually breathe the purest air.

The miasms arising from churchyards are in general too much diluted by the surrounding air to strike the neighbouring inhabitants with sudden and severe disease, yet they may materially injure the health, and the evidence appears to me to be decisive that they often do so. Among others who sometimes obviously suffer from this cause, are the families of clergymen, when, as occasionally happens, the vicarage or rectory is situated very close to a full churchyard. I myself know one such clergyman's family, whose dwelling-house is so close to an extremely full churchyard that a very disagreeable smell from the graves is always perceptible in some of the sitting and sleeping rooms. The mother of this family states that she has never had a day's health since she has resided in this house, and that her children are always ailing; and their ill health is attributed, both by the family and their medical friends, to the offensive exhalations from the churchyard.

Dr. Lyon Playfair states as follows in his communication—

There are two kinds of changes which animal and vegetable matter undergo, when exposed to certain influences. These are known by the terms of "decay" and "putrefaction." Decay, properly so called, is a union of the elements of organic matter with the oxygen of the air; while putrefaction, although generally commencing with decay, is a change or transformation of the elements of the organic body itself, without any necessary union with the oxygen of the air. When decay proceeds in a body without putrefaction, offensive smells are not generated; but if the air in contact with the decaying matter be in any way deficient, the decay passes into putrefaction, and putrid smells arise. Putrid smells are rarely if ever evolved from substances destitute of the element nitrogen.

Both decaying and putrefying matters are capable of communicating their own state of putrefaction or of decay to any organic matter with which they may come in contact. To take the simplest case, a piece of decayed wood, a

decaying orange, or a piece of tainted flesh, is capable of causing similar decay or putrefaction in another piece of wood, orange, or flesh. In a similar manner the decaying gases evolved from sewers occasion the putrescence of meat or of vegetables hung in the vicinity of the place from which they escape. But this communication of putrefaction is not confined to dead matter. When tainted meat or putrescent blood-puddings are taken as food, their state of putrefaction is frequently communicated to the bodies of the persons who have used them as food. A disease analogous to rot ensues, and generally terminates fatally. Happily this disease is little known among us, but it is of very frequent occurrence in Germany.

The decay or putrefaction communicated by putrid gases or by decaying matters does not always assume one form, but varies according to the organs to which their peculiar state is imparted. If communicated to the blood, it might possibly happen that fever may arise; if to the intestines, dysentery or diarrhœa might result; and I think it might even be a question worthy of consideration, whether consumption may not arise from such exposure. Certainly it seems to do so among cattle. The men who are employed in cleaning out drains are very liable to the attacks of dysentery and of diarrhœa; and I recollect instances of similar diseases occurring among some fellow-students when I attended the dissecting-rooms.

The effects produced by decaying emanations will vary according to the state of putrefaction or decay in which these emanations are, as well as according to their intensity and concentration. Thus it occurs frequently that persons susceptible to contagion may be in the vicinity of a fever patient without acquiring the disease. I know one celebrated medical man who attends his own patients in fever without danger, but who has never been able to take charge of the fever-wards in an infirmary, from the circumstance of his being unable to resist the influence of the contagion under such circumstances. This gentleman has had fever several times. This shows that the contagion of fever requires a certain degree of *concentration* before it is able to produce its immediate effects. A knowledge of this circumstance has induced several infirmaries (the Bristol infirmary, for example,) to abolish altogether fever-wards and to scatter the fever cases indiscriminately through the medical wards. Owing to this distribution, cases in which fever is communicated to other patients or nurses in the infirmary are very unfrequent, although they are far from being so in those hospitals where the fever cases are grouped together.

I consider that the want of attention to the circumstance of the concentration of decaying emanations is a great reason that the effects of miasmata in producing fever is still a *questio vexata*. Thus there may be many churchyards and sewers evolving decaying matter, and yet no fever may occur in the locality. Some other more modified effect may be produced, according to the degree of concentration of the decaying matter, such as diarrhœa or even dysentery; or there may be no perceptible effects produced, although the blood may still be thrown into a diseased state which will render it susceptible to any specific contagion that approaches. It must be remembered that decaying exhalations will not always produce similar effects, but that these will vary, not only according to the concentration, but also according to the state of decomposition in which the decaying matters are.

The rennet for making cheese is in a peculiar state of decay, or rather is capable of a series of states of decay, and the flavour of the cheese manufactured by means of it varies also according to the state of the rennet. Just so with the diseases produced by the peculiar state or concentration of decaying matters or of specific contagions. When the Asiatic cholera visited this country many of the towns were afflicted with dysentery before the cholera appeared in an unquestionable form. In like manner the miasmata evolved from churchyards may produce injurious effects which may not be sufficiently marked to call attention until they assume a more serious form by becoming more concentrated. But notwithstanding the absence of marked effects, it is extremely probable that constant exposure to miasmata may produce a diseased

state of the blood. Thus I had occasion to visit and report upon, amongst other matters, the state of slaughter-houses in Bristol. These are generally situated in courts, very inefficiently ventilated, as all courts are. I remarked that the men employed in the slaughter-houses had a remarkably cadaverous hue, and this was participated in a greater or less degree by the inhabitants of the court. So much was this the case, that in a court where the smells from the slaughter-house were so offensive that my companion had immediately to retire from sickness, I immediately singled out one person as not belonging to the court from a number of people who ran out of their houses to inquire the object of my visit. The person who attracted my attention from her healthy appearance compared with the others, had entered this court to pay a visit to a neighbour.

§ 11. That conclusions respecting such immensely important effects can only be established by reasonings on facts frequently so scattered over distant times and places as to require much research to bring them together; that those conclusions are still open to controversy, and have hitherto been maintained only by references to statements of distant observations, whilst regularly sustained examinations of the events occurring daily in our large towns might have placed them beyond a doubt; may be submitted as showing the necessity of some public arrangements to insure constant attention, and complete information on these subjects, as the basis of complete measures of prevention.

§ 12. The conclusions, however, which appear to be firmly established by the evidence, and the preponderant medical testimony, are on every point, as to the essential character of the physical evils connected with the practice of interment, so closely coincident with the conclusions deduced from observation on the continent, that from Dr. Riccke's report (and to which a prize was awarded by an eminent medical association), in which the preponderant medical opinions are set forth, they may be stated in the following terms:—

“The general conclusions from the foregoing report may be given as follows:

“The injurious effect of the exhalations from the decomposition in question upon the health and life of man is proved by a sufficient number of trustworthy facts;

“That this injurious influence is by no means constant, and depends on varying and not yet sufficiently explained circumstances;

“That this injurious influence is manifest in proportion to the degree of concentration of putrid emanations, especially in confined spaces; and in such cases of concentration the injurious influence is manifest in the production of asphyxia and the sudden and entire extinction of life;

“That, in a state less concentrated putrid emanations produce various effects on the nerves of less importance, as fainting, nausea, headache, languor;

“These emanations, however, if their effect is often repeated, or if the emanations be long applied, produce nervous and putrid fevers; or impart to fevers, which have arisen from other causes, a typhoid or putrid character;

“Apparently they furnish the principal cause of the most developed form of typhus, that is to say, the plague (*Der Bubonensest*). Besides the products of decomposition, the contagious material may also be active in the emanations arising from dead bodies.”

§ 13. Such being the nature of the emanations from human remains in a state of decomposition, or in a state of corruption, the obtainment of any definite or proximate evidence of the extent of the operation of those emanations on the health of the population nevertheless appears to be hopeless in crowded districts. In such districts the effects of an invisible fluid have not been observed, amidst a complication of other causes, each of a nature ascertained to produce an injurious effect upon the public health, but undistinguished, except when it accidentally becomes predominant. The sense of smell in the majority of inhabitants seems to be destroyed, and having no perception even of stench which are insupportable to strangers, they must be unable to note the excessive escapes of miasma as antecedents to disease. Occasionally, however, some medical witnesses, who have been accustomed to the smell of the dissecting-room, detect the smell of human remains from the graveyards, in crowded districts; and other witnesses have stated that they can distinguish what is called the “dead man’s smell,” when no one else can, and can distinguish it from the miasma of the sewers.

In the case of the predominance of the smell from the graveyard, the immediate consequence ordinarily noted is a headache. A military officer stated to me that when his men occupied as a barrack a building which opened over a crowded burial-ground in Liverpool, the smell from the ground was at times exceedingly offensive, and that he and his men suffered from dysentery. A gentleman who had resided near that same ground, stated to me that he was convinced that his own health, and the health of his children had suffered from it, and that he had removed to avoid further injury. The following testimony of a lady, respecting the miasma which escaped from one burial-ground at Manchester, is adduced as an example of the more specific testimony as to the perception of its effects. This testimony also brings to view the circumstance that in the towns it is not only in surface emanations from the graveyards alone that the morbid matter escapes.

You resided formerly in the house immediately contiguous to the burying-ground of — chapel, did you not?—Yes I did, but I was obliged to leave it.

Why were you so obliged?—When the wind was west, the smell was dreadful. There is a main sewer runs through the burying-ground, and the smell of the dead bodies came through this sewer up our drain, and until we got that trapped, it was quite unbearable.

Do you not think the smell arose from the emanations of the sewer, and not from the burying ground?—I am sure they came from the burying-ground; the smell coming from the drain was exactly the same as that which reached us when the wind was west, and blew upon us from the burying-ground. The smell was very peculiar; it exactly resembled the smell which clothes have when they are removed from a dead body. My servants would not re-

main in the house on account of it, and I had several cooks who removed on this account.

Did you observe any effects on your health when the smells were bad?—Yes, I am liable to headaches, and these were always bad when the smells were so also. They were often accompanied by diarrhœa in this house. Before I went there, and since I left, my headaches have been very trifling.

Were any of the other inmates of the house afflicted with illness?—I had often to send for the surgeon to my servants, who were liable to ulcerated sore throats.

And your children, were they also affected?—My youngest child was very delicate, and we thought he could not have survived; since he came here he has become quite strong and healthy, but I have no right to say the burying-ground had any connexion with his health.

§ 14. In the course of an examination of the chairman and Surveyor of the Holborn and Finsbury Division of Sewers, on the general management of sewers in London, the following passage occurs;—

“You do not believe that the nuisance arises in all cases from the main sewers? (Mr. Roe)—Not always from the main sewers. (Mr. Mills)—Connected with this point, I would mention, that where the sewers came in contact with churchyards, the exudation is most offensive.

“Have you noticed that in more than one case?—Yes.

“In those cases have you had any opportunities of tracing in what manner the exudation from the churchyards passed to the sewer?—It must have been through the sides of the sewers.

“Then, if that be the case, the sewer itself must have given way?—No; I apprehend even if you use concrete, it is impossible but that the adjacent waters would find their way even through cement; it is the natural consequence. The wells of the houses adjacent to the sewers all get dry whenever the sewers are lowered.

“You are perfectly satisfied that in the course of time exudations very often do, to a certain extent, pass through the brickwork?—Yes; it is impossible to prevent it.

“Have you ever happened to notice whether there was putrid matter in all cases where the sewer passed through a burial-ground?—The last churchyard I passed by was in the parish of St. Pancras, when the sewer was constructing. I observed that the exudation from it into the sewer was peculiarly offensive, and was known to arise from the decomposition of the bodies.

“At what distance was the sewer from the churchyard where you found that?—Thirty feet.”

Mr. Roe subsequently stated—

“Mr. Jacob Post, living at the corner of Church-street, Lower Road, Islington, stated to our clerk of the works, when we were building a sewer opposite Mr. Post's house, that he had a pump, the water from the well attached to which had been very good, and used for domestic purposes; but that, since a burying-ground was formed above his house, the water in his well had become of so disagreeable a flavour as to prevent its being used as heretofore: and he was in hopes that the extra depth of our sewer would relieve him from the drainage of the burying-ground, to which he attributed the spoiling of his water.”

Professor Brande states that he has “frequently found the well-water of London contaminated by organic matters and ammoniacal salts,” and refers to an instance of one well near a churchyard, “the water of which had not only acquired odour but colour from the soil;” and mentions other instances of which he has heard, as justifying the opinion, that as “very many of

these wells are adjacent to churchyards, the accumulating soil of which has been so heaped up by the succession of dead bodies and coffins, and the products of their decomposition, as to form a filtering apparatus, by which all *superficial* springs must of course be more or less affected." Some of the best springs in the metropolis are, fortunately, of a depth not likely to be considerably affected by such filtration. In Leicester, and other places, I have been informed of the disuse of wells near churchyards, on account of the perception of a taint in them. The difficulty of distinguishing by any analysis the qualities of the morbid matter when held in solution or suspension in water, in combination with other matters in towns, and the consequent importance of the separate examination already given to those qualities, may be appreciated from such cases as the following, which are by no means unfrequent. In the instance of the water of one well in the metropolis, which had ceased to be used, in consequence of an offensive taste (contracted, as was suspected, from the drainage of an adjacent churchyard), it was doubted whether it could be determined by analysis what portion of the pollution arose from that source, what from the leakage of adjacent cess-pools, and what from the leakage of coal-gas from adjacent gas-pipes. In most cases of such complications, the parties responsible for any one contributing source of injury are apt to challenge, as they may safely do, distinct proof of the separate effect produced by that one. Popular perceptions, as well as chemical analysis, are at present equally baffled by the combination, and complaints of separate injuries are rarely made. If, therefore, the combined evil is to remain until complaints are made of the separate causes, and their specific effects on the health, and until they can be supported by demonstration, perpetual immunity would be insured to the most noxious combinations.

The effects of unguarded interments have, however, as will subsequently be noticed, been observed with greater care on the continent, and the proximity of wells to burial-grounds has been reported to be injurious. Thus it is stated in a collection of reports concerning the cemeteries of the town of Versailles, that the water of the wells which lie *below* the churchyard of St. Louis could not be used on account of its stench. In consequence of various investigations in France, a law was passed, prohibiting the opening of wells within 100 metres of any place of burial; but this distance is now stated to be insufficient for deep wells, which have been found, on examination, to be polluted at a distance of from 150 to 200 metres. In some parts of Germany, the opening of wells nearer than 300 feet has been prohibited.

§ 15. Where the one deleterious cause is less complicated with others, as in open plains after the burial of the dead in fields of battle, the effects are perceived in the offensiveness of the surface

emanations, and also in the pollution of the water, followed by disease, which compels the survivors to change their encampments.

The fact is thus adduced in the evidence of Dr. Copeland:—

“It is fully ascertained and well recognised that the alluvial soil, or whatever soil that receives the exuvæ of animal matter, or the bodies of dead animals, will become rich in general; it will abound in animal matter; and the water that percolates through the soil thus enriched will thus become injurious to the health of the individuals using it: that has been proved on many occasions, and especially in warm climates, and several remarkable facts illustrative of it occurred in the peninsular campaigns. It was found, for instance, at Ciudad Rodrigo, where, as Sir J. Macgregor states in his account of the health of the army, there were 20,000 dead bodies put into the ground within the space of two or three months, that this circumstance appeared to influence the health of the troops, inasmuch as for some months afterwards all those exposed to the emanations from the soil, as well as obliged to drink the water from the sunk wells, were affected by malignant and low fevers and dysentery, or fevers frequently putting on a dysenteric character.”

§ 16. In the metropolis, on spaces of ground which do not exceed 203 acres, closely surrounded by the abodes of the living, layer upon layer, each consisting of a population numerically equivalent to a large army of 20,000 adults, and nearly 30,000 youths and children, is every year imperfectly interred. Within the period of the existence of the present generation, upwards of a million of dead must have been interred in those same spaces.

§ 17. A layer of bodies is stated to be about seven years in decaying in the metropolis; to the extent that this is so, the decay must be by the conversion of the remains into a gas, and its escape, as a miasma, of many times the bulk of the body that has disappeared.

§ 18. In some of the populous parishes, where, from the nature of the soil, the decomposition has not been so rapid as the interments, the place of burial has risen in height; and the height of many of them must have greatly increased but for surreptitious modes of diminishing it by removal, which, it must be confessed, has diminished the sanitary evil, though by the creation of another and most serious evil, in the mental pain and apprehensions of the survivors and feelings of abhorrence of the population, caused by the suspicion and knowledge of the disrespect and desecration of the remains of the persons interred.

§ 19. The claims to exemption in favour of burial-grounds which it is stated are not overcrowded would perhaps be most favourably considered by the examination of the practice of interment in the new cemeteries, where the proportion of interments to the space is much less.

§ 20. I have visited and questioned persons connected with

several of these cemeteries in town and country, and I have caused the practice of interments in others of them to be examined by more competent persons. The inquiry brought forward instances of the bursting of some leaden coffins and the escape of mephitic vapour in the catacombs; the tapping of others to prevent similar casualties; injuries sustained by grave-diggers from the escapes of miasma on the re-opening of graves, and an instance was stated to me by the architect of one cemetery, of two labourers having been injured, apparently by digging amidst some impure water which drained from some graves. No precedent examination of the evils affecting the public health, that are incident to the practice of interment, appears to have been made, no precedent scientific or impartial investigation appears to have been thought necessary by the joint-stock companies, or by the Committees of the House of Commons, at whose instance privileges were conferred upon the shareholders; no new precautionary measures or improvements such as are in use abroad, appear consequently to have been introduced in them; the practice of burial has in general been simply removed to better looking, and in general, better situated places. The conclusion, however, from the examination of these places (which will subsequently be reverted to) is, that if most of the cemeteries themselves were in the midst of the population, they would, even in their present state, often contribute to the combination of causes of ill health in the metropolis, and several of the larger towns.

§ 21. It has been considered that all danger from interments in towns would be obviated if no burials were allowed except at a depth of five feet. But bodies buried much deeper are found to decay; and so certain as a body has wasted or disappeared is the fact that a deleterious gas has escaped. In the towns where the graveyards and streets are paved, the morbid matter must be diffused more widely through the sub-soil, and escape with the drainage. If the interments be so deep as to impede escapes at the surface, there is only the greater danger of escape by deep drainage and the pollution of springs.

Dr. Reid detected the escape of deleterious miasma from graves of more than 20 feet deep. He states—

In some churchyards I have noticed the ground to be absolutely saturated with carbonic acid gas, so that whenever a deep grave was dug it was filled in some hours afterwards with such an amount of carbonic acid gas that the workmen could not descend without danger. Deaths have, indeed, occurred occasionally in some churchyards from this cause, and in a series of experiments made in one of the churchyards at Manchester, where deep graves are made, each capable of receiving from 20 to 30 bodies, I found in general that a grave covered on the top at night was more or less loaded with carbonic acid in the morning, and that it was essential, accordingly, to ventilate these grave-pits before it was safe to descend.

This I effected on some occasions by means of a small chauffer placed at the top, and at one end of the grave a tube or hose being let down from it to the bottom of the grave. The fire was sustained by the admission of a small portion of fresh air at the top, and the air from the bottom of the grave was gra-

dually removed as the upper stratum was heated by the fire around which it was conveyed; and when it had been once emptied in this manner a small fire was found sufficient to sustain a perpetual renewal of air, and prevent the men at work in the grave-pits from being subject to the extreme oppression to which they are otherwise liable, even when there may be no immediate danger. A mechanical power might be used for the same purpose; and chemical agents, as a quantity of newly slaked lime, are frequently employed, as they absorb the carbonic acid. From different circumstances that have since occurred, it appears to me probable that numerous examples of strata or superficial soil containing carbonic acid may be more frequently met with than is generally suspected, and that while in churchyards the presence of large quantities of carbonic acid may be frequently anticipated, its presence must not always be attributed solely to the result of the decomposition of the human body.

The amount of carbonic acid that collects within a given time in a deep grave-pit intended to receive 20 or 30 bodies, is much influenced by the nature of the ground in which it is dug. In the case referred to, the porous texture of the earth allowed a comparatively free aerial communication below the surface of the ground throughout its whole extent. It was, in reality, loaded with carbonic acid in the same manner as other places are loaded with water; it was only necessary to sink a pit, and a well of carbonic acid was formed, into which a constant stream of the same gas continued perpetually to filter from the adjacent earth, according to the extent to which it was removed. From whatever source, however, the carbonic acid may arise, it is not the less prone to mingle with the surrounding air, and where the level of the floor of the church is below the level of the churchyard, there the carbonic acid is prone to accumulate, as, though it may be ultimately dispersed by diffusion, it may be considered as flowing in the same manner in the first instance as water, where the quantity is considerable.

Again, where the drainage of the district in which the church may be placed is of an inferior description, and liable to be impeded periodically by the state of the tide, as in the vicinity of the Houses of Parliament, where all the drains are closed at high water, the atmosphere is frequently of the most inferior quality. I am fully satisfied, for instance, not only from my own observation, but from different statements that have reached me, and also from the observations of parties who have repeatedly examined the subject at my request, that the state of the burying-ground around St. Margaret's church is prejudicial to the air supplied at the Houses of Parliament, and also to the whole neighbourhood. One of them, indeed, stated to me lately that he had avoided the churchyard for the last six months, in consequence of the effects he experienced the last time he visited it. These offensive emanations have been noticed at all hours of the night and morning; and even during the day the smell of the churchyard has been considered to have reached the vaults in the House of Commons, and traced to sewers in its immediate vicinity. When the barometer is low, the surface of the ground slightly moist, the tide full, and the temperature considerable—all which circumstances tend to favour the evolution of effluvia both from the grave-pits and the drains—the most injurious influence upon the air is observed. In some places not far from this churchyard fresh meat is frequently tainted in a single night, on the ground-floor, in situations where at a higher level it may be kept without injury for a much longer period. In some cases, in private houses as well as at the Houses of Parliament, I have had to make use of ventilating shafts, or of preparations of chlorine, to neutralize the offensive and deleterious effects which the exhalations produced, while, on other occasions, their injurious influence has been abundantly manifested by the change induced in individuals subjected to their influence on removing to another atmosphere. No grievance, perhaps, entails greater physical evils upon any district than the conjoined influence of bad drainage and crowded churchyards; and until the drainage of air from drains shall be secured by the process adverted to in another part of this work, or some equivalent measures, they cannot be regarded as free from a very important defect.

The drainage of air from drains is, indeed, desirable under any circumstances; but when the usual contaminations of the drain are increased by the emanations from a loaded churchyard, it becomes doubly imperative to introduce such measures; and if any one should desire to trace the progress of reaction by which the graveyards are continually tending to free themselves of their contents, a very brief inquiry will give him abundant evidence on this point. My attention was first directed to this matter in London ten years ago, when a glass of water handed to me at a hotel, in another district, presented a peculiar film on its surface, which led me to set it aside; and after numerous inquiries, I was fully satisfied that the appearance which had attracted my attention arose from the coffins in a churchyard immediately adjoining the well where the water had been drawn. Defective as our information is as to the precise qualities of the various products from drains, churchyards, and other similar places, I think I have seen enough to satisfy me that in all such situations the fluids of the living system imbibe materials which, though they do not always produce great severity of disease, speedily induce a morbid condition, which, while it renders the body more prone to attacks of fever, is more especially indicated by the facility with which all the fluids pass to a state of putrefaction, and the rapidity with which the slightest wound or cut is apt to pass into a sore.

Mr. Leigh, surgeon and lecturer of chemistry at Manchester, confirms the researches made by Dr. Reid in that town, and observes on this subject—

But the decomposition of animal bodies is remarkably modified by external circumstances where the bodies are immersed in or surrounded by water, and particularly, if the water undergo frequent change, the solid tissues become converted into adipocire, a fatty spermaceti-like substance, not very prone to decomposition, and this change is effected without much gaseous exhalation. Under such circumstances nothing injurious could arise, but under ordinary conditions slow decomposition would take place, with the usual products of the decomposition of animal matters, and here the nature of the soil becomes of much interest. If the burial-ground be in damp dense compact clay, with much water, the water will collect round the body, and there will be a disposition to the formation of adipocire, whilst the clay will effectually prevent the escape of gaseous matter. If on the other hand the bodies be laid in sand or gravel, decomposition will readily take place, the gases will easily permeate the superjacent soil and escape into the atmosphere, and this with a facility which may be judged of when the fact is stated that under a pressure of only three-fourths of an inch of water, coal gas will escape by any leakage in the conduit pipes through a stratum of sand or gravel of three feet in thickness in an exceedingly short space of time. The three feet of soil seems to oppose scarcely any resistance to its passage to the surface; but if the joints of the pipes be enveloped by a thin layer of clay, the escape is effectually prevented. If bodies were interred eight or ten feet deep in sandy or gravelly soils, I am convinced little would be gained by it; the gases would find a ready exit from almost any practicable depth.

§ 22. He also expresses an opinion concurrent with that of other physiologists, that the effects of these escapes in an otherwise salubrious locality, soon attract notice, but their influence in obedience to the laws of gaseous diffusion, developed by Dalton and Graham, is not the less scattered over a town, because in a multitude of scents they escape observation. In open rural districts these gases soon intermix with the circumambient air, and become so vastly diluted that their injurious tendency is less potent.

Other physical facts which it is necessary to develope in re-

spect to the practice of interment may be the most conveniently considered in a subsequent portion of this report, where it is necessary to adduce the information possessed, as to the sites of places of burial, and the sanitary precautions necessary in respect to them.

§ 23. From what has already been adduced, it may here be stated as a conclusion,

That inasmuch as there appear to be no cases in which the emanations from human remains in an advanced stage of decomposition are not of a deleterious nature, so there is no case in which the liability to danger should be incurred either by interment (or by entombment in vaults, which is the most dangerous) amidst the dwellings of the living, it being established as a general conclusion in respect to the physical circumstances of interment, from which no adequate grounds of exception have been established :—

That all interments in towns, where bodies decompose, contribute to the mass of atmospheric impurity which is injurious to the public health. +

§ 24. Amongst these means, one for preventing the escape of emanations at the surface by absorbing and purifying them, is entirely in accordance with the popular feeling. The great body of English poetry, which it has been remarked is more rich on the subject of sepulture than the poetry of any other nation, abounds with reference to the practice of ornamenting graves with flowers, shrubs, and trees. A rich vegetation exercises a powerful purifying influence, and where the emanations are moderate, as from single graves, would go far to prevent the escape of any deleterious miasma. It is conceived that the escapes of large quantities of deleterious gases by the fissuring of the ground would often be in a very great degree prevented by turving over the surface, or by soiling, that is, by laying vegetable mould of five or six inches in thickness and sowing it carefully with grasses whose roots spread and mesh together. At the Abney Park Cemetery, where the most successful attention is paid to the vegetation, this is done; but in some districts of towns it marks the impurity of the common atmosphere that even grass will not thrive; and that flowers and shrubs which live on the river side, or in spaces open to the breeze, become weakly and die rapidly in the enclosed spaces in the crowded districts. Several species of evergreens, and the plants which have gummy or resinous leaves, that are apt to retain soot or dust, die quickly. The influence, therefore, of a full variety of flowers and a rich vegetation, so necessary for the actual purification of the atmosphere, as well as to remove associations of impurity, and refresh the eye and soothe the mind, can only be obtained at a distance from most towns. It occasionally happens that individuals incur expense to decorate graves in the town churchyards with flowers, and more would do so, even in the churchyards near thoroughfares, but that they perish.

Moral influence of seclusion from thronged places, and of decorative Improvements in National Cemeteries, and arrangements requisite for the satisfactory performance of Funeral Rites.

§ 25. The images presented to the mind by the *visible* arrangements for sepulture, are inseparably associated with the ideas of death itself to the greater proportion of the population. Neglected or mismanaged burial-grounds superadd to the indefinite terrors of dissolution, the revolting image of festering heaps, disturbed and scattered bones, the prospect of a charnel-house, and its associations of desecration and insult. With burial-grounds that are undrained, for example, the associations expressed by the labouring classes on the occasion of burial there, are similar to those which would arise on plunging a sentient body into a "watery grave." Where there is nothing visible to raise such painful associations, a feeling of dislike is manifested to the "common" burial-grounds in crowded districts, or to their "dreariness," in the districts which are the least frequented.

The Rev. H. H. Milman, the rector of St. Margaret's, Westminster, probably adverts to these associations when questioned before the Committee of the House of Commons with reference to the expediency of discontinuing burial in his own parish.

In reference to the churchyard of St. Margaret's, is that full or not?—It is very full.

Can you with convenience inter there?—My own opinion is, that interment ought to be discontinued there for several reasons; not because I have ever heard of any noxious effect upon the health of the neighbourhood, *but on account of its public situation; it is a thoroughfare*, and in point of fact, it has been a cemetery so long, and it is so crowded, that interment cannot take place without interfering with previous interments.

Mr. Wordsworth, in a paper first published by Mr. Coleridge, has thus expressed the same sentiments, and the feelings, which it is submitted, are entitled to regard, in legislating upon this subject:—

"In ancient times, as is well known, it was the custom to bury the dead beyond the walls of towns and cities, and among the Greeks and Romans they were frequently interred by the waysides.

"I could here pause with pleasure, and invite the reader to indulge with me in contemplation of the advantages which must have attended such a practice. We might ruminate on the beauty which the monuments thus placed must have borrowed from the surrounding images of nature, from the trees, the wild flowers, from a stream running within sight or hearing, from the beaten road, stretching its weary length hard by. Many tender similitudes must these objects have presented to the mind of the traveller, leaning upon one of the tombs, or reposing in the coolness of its shades, whether he had halted from weariness, or in compliance with the invitation, 'Pause traveller,' so often found upon the monuments. And to its epitaph must have been sup-

plied strong appeals to visible appearances or immediate impressions, lively and affecting analogies of life as a journey—death as a sleep overcoming the tired wayfarer—of misfortune as a storm that falls suddenly upon him—of beauty as a flower that passeth away, or of innocent pleasure as one that may be gathered—of virtue that standeth firm as a rock against the beating waves;—of hope undermined insensibly like the poplar by the side of the river that has fed it, or blasted in a moment like the pine tree by the stroke of lightning on the mountain top—of admonitions and heart-stirring remembrances, like a refreshing breeze that comes without warning, or the taste of the waters of an unexpected fountain. These and similar suggestions must have given formerly, to the language of the senseless stone, a voice enforced and endeared by the benignity of that nature with which it was in unison.

“We in modern times have lost much of these advantages; and they are but in a small degree counterbalanced to the inhabitants of large towns and cities, by the custom of depositing the dead within or contiguous to their places of worship, however splendid or imposing may be the appearance of those edifices, or however interesting or salutary may be the associations connected with them. Even were it not true, that tombs lose their monitory virtue when thus obtruded upon the notice of men occupied with the cares of the world, and too often sullied and defiled by those cares; yet still, when death is in our thoughts, nothing can make amends for the want of the soothing influences of nature, and for the absence of those types of renovation and decay which the fields and woods offer to the notice of the serious and contemplative mind. To feel the force of this sentiment, let a man only compare, in imagination, the unsightly manner in which our monuments are crowded together in the busy, noisy, unclean, and almost grassless churchyard of a large town, with the still seclusion of a Turkish cemetery in some remote place, and yet further sanctified by the grove of cypress in which it is embosomed.”

§ 26. Careful visible arrangements, of an agreeable nature, raise corresponding mental images and associations which diminish the terrors incident to the aspect of death. Individuals who have purchased portions of decorated cemeteries for their own interment in the metropolis, make a practice of visiting them for the sake, doubtless, of those solemn but tranquil thoughts which the place inspires as personally connected with themselves. The establishment of a cemetery at Highgate was strongly opposed by the inhabitants, but when its decorations with flowers and shrubs and trees, and its quiet and seclusion were seen, applications were made for the purchase of keys, which conferred the privilege of walking in the cemetery at whatever time the purchaser pleased. If the chief private cemeteries in the suburbs of the metropolis were thrown open on a Sunday, they would on fine days be often thronged by a respectful population. Such private cemeteries

as have been formed, though pronounced to be only improvements on the places of burial in this country, and far below what it would yet be practicable to accomplish, have indisputably been viewed with public satisfaction, and have created desires of further advances by the erection of national cemeteries. Abroad the national cemeteries have obtained the deepest hold on the affections of the population. I have been informed by an accomplished traveller, who has carefully observed their effects, that cemeteries have been established near to all the large towns in the United States. To some of these cemeteries a horticultural garden is attached; the garden walks being connected with the places of interment, which, though decorated, are kept apart. These cemeteries are places of public resort, and are there observed, as in other countries, to have a powerful effect in soothing the feelings of those who have departed friends, and in refining the feelings of all. At Constantinople, the place of promenade for Europeans is the cemetery at Pera, which is planted with cypress, and has a delightful position on the side of a hill overlooking the Golden Horn. The greatest public cemetery attached to that capital is at Scutari, which forms a beautiful grove, and disputes in attraction, as a place for readers, with the fountains and cloisters of the Mosques.

§ 27. In Russia, almost every town of importance has its burial-place at a distance from the town, laid out by the architect of the government. It is always well planted with trees, and is frequently ornamented with good pieces of sculpture. Nearly every German town has its cemetery at a distance from the town, planted with trees and ornamented with public and private monuments. Most of the cemeteries have some choice works of art or public monument, which alone would render them an object of attraction. For instance, at Saxe Weimar, the cemetery contains the tombs of Goethe and Schiller placed in the mausoleum of the ducal family. In Turkey, Russia, and Germany the poorer classes have the advantages of interment in the national cemeteries. In Russia it is the practice to hold festivals twice a-year over the graves of their friends. In several parts of Germany similar customs prevail. At Munich, the festival on All Saints' Day (November the 1st) is described as one of the most extraordinary spectacles that is to be seen in Europe.* The tombs are decorated in a most remarkable

* The neglect of the cemeteries at Paris, and especially of those portions dedicated to the interment of the poorer classes, has been the subject of public complaint, and means are now being taken to redress them. A friend, who aided me with some inquiries in respect to them, states,—

The English tourist in visiting Père la Chaise is attracted by splendid monuments in the midst of cypress trees, and little gardens filled with flowers planted round a majority of the tombs; but the graves of the humbler classes lie beyond these, and to them the stranger is seldom conducted. The contrast is painful. When I last visited Père la Chaise, on a fine day in November, and after a week of unusually fine weather for the season, I found the paths quite impracticable in the poorer quarter of the cemetery, and as I watched a man, in the usual blouse dress worn by the working class, picking his way through the mud to lead his little boy to pray

manner with flowers, natural and artificial, branches of trees, canopies, pictures, sculptures, and every conceivable object that can be applied to ornament or decorate. The labour bestowed on some tombs requires so much time, that it is commenced two or three days beforehand, and protected while going on by a temporary roof. During the whole of the night preceding the 1st of November, the relations of the dead are occupied in completing the decoration of the tombs, and during the whole of All Saints' Day and the day following, being All Souls' Day, the cemetery is visited by the entire population of Munich, including the king and queen, who go there on foot, and many strangers from distant parts. Mr. Loudon states that, when he was there, it was estimated that 50,000 persons had walked round the cemetery in one day, the whole, with very few exceptions, dressed in black. On November the 3d, about mid-day, the more valuable decorations are removed, and the remainder left to decay from the effects of time and weather.

§ 28. A review of the circumstances influencing the public feeling, and of the tendencies marked by the recent changes of practice in this country, and of the effects of the public institutions for interment amongst other civilized nations, enforce the conclusion that those arrangements to which the attention of the population is so earnestly directed, should be made with the greatest care, and that places of public burial demand the highest order of art in laying out the sites, and decorating them with trees and architectural structures of a solemn and elevating character. National arrangements with such objects, would be followed up and supported by the munificence of private individuals, and by various communities. It is observable in the metropolis, and in the larger towns, that the direction of private feeling in the choice of sepulture is less affected by locality or neighbourhood, than by classes of profession or occupation, or social communion when living, and that such feelings would tend to association in the grave and monumental decoration. A proposal has been in circulation for the purchase of a portion of one of the new cemeteries, for the erection of a mausoleum for persons of the naval and military professions—members of the United Service Clubs. At the public cemetery of Mayence are interred 150 veteran soldiers, officers and privates, natives of the town, who were buried in one spot, denoted by a monument on which each man's name and course of service is inscribed in gold letters, and the monument is surmounted by a statue of the general under whom they served. At Berlin there is a cemetery connected with the *Invaliden haus* founded by Frederick the Great, in which many of the generals are buried with the private soldiers. The ground is well laid out, and ornamented with monuments, the latest of which are executed by Tieck, and other celebrated sculptors. This

over the grave of his mother, I could but deplore the economy of an administration which had neglected to provide, at least, a dry gravel path for the humble and pious mourner.

cemetery forms the favourite walk of the old soldiers. The great moral force, and the consolation to the dying and the incentive to public spirit whilst living, derivable from the natural regulations of a public cemetery, is almost entirely lost in this country, except in the few cases where public monuments are provided in the cathedrals. In the metropolis it would be very difficult to find the graves of persons of minor fame who have advanced or adorned any branch of civil or military service, or have distinguished themselves in any art or science. Yet there are few occupations which could not furnish examples for pleasurable contemplation to the living who are engaged in them, and claim honour from the public. The humblest class of artisans would feel consolation and honour in interment in the same cemetery with Brindley, with Crompton, or with Murdoch, the artisan who assisted and carried out the conceptions of Watt; or with Emerson, or with Simpson, the hand-loom weaver, who became professor of mathematics at Woolwich; or with Ferguson, the shepherd's son; or with Dollond, the improver of telescopes, whose earliest years were spent at a loom in Spitalfields; or with others who "have risen from the wheelbarrow" and done honour to the country, and individually gained public attention from the ranks of privates; such for example as John Sykes, Nelson's cockswain, an old and faithful follower, who twice saved the life of his admiral by parrying the blows that were aimed at him, and at last actually interposed his own person to meet the blow of an enemy's sabre which he could not by any other means avert, and who survived the dangerous wound he received in this act of heroic attachment. The greater part of the means of honour and moral influence on the living generation derivable from the example of the meritorious dead of every class, is at present in the larger towns cast away in obscure graveyards and offensive charnels. The artisans who are now associated in communities which have from their beneficent objects a claim to public regard, might if they chose it have their spaces set apart for the members of their own occupation, and whilst they derive interest from association with each other, they would also derive consolation from accommodation within the same precincts as the more public and illustrious dead.

§ 29. It is due to the memory of Sir Christopher Wren, to state that extra-mural or suburban cemeteries formed part of his plan for the rebuilding of London after the great fire. "I would wish," says he, "that all burials in churches might be disallowed, which is not only unwholesome, but the pavements can never be kept even, nor pews upright: and if the churchyard be close about the church, this is also inconvenient, because the ground being continually raised by the graves occasions in time a descent by steps into the church, which renders it damp, and the walls green, as appears evidently in all old churches. It will be inquired where, then, shall be the burials?—I answer, in cemeteries

seated in the outskirts of the town; and since it has become the fashion of the age to solemnize funerals by a train of coaches (even where the deceased are of moderate condition), though the cemeteries should be half a mile or more distant from the church, the charge need be little or no more than usual; the service may be first performed in the church: but for the poor and such as must be interred at the parish charge, a public hearse of two wheels and one horse may be kept at small expense, the usual bearers to lead the horse, and take out the corpse at the grave. A piece of ground of two acres, in the fields, will be purchased for much less than two roods amongst the buildings. This being enclosed with a strong brick wall, and having a walk round, and two cross walks, decently planted with yew trees, the four quarters may serve four parishes, where the dead need not be disturbed at the pleasure of the sexton, or piled four or five upon one another, or bones thrown out to gain room. In these places beautiful monuments may be erected; but yet the dimensions should be regulated by an architect, and not left to the fancy of every mason; for thus the rich with large marble tombs would shoulder out the poor: when a pyramid, a good bust, or statue on a proper pedestal will take up little room in the quarters, and be properer than figures lying on marble beds: the walls will contain escutcheons and memorials for the dead, and the real good air and walks for the living. It may be considered, further, that if the cemeteries be thus thrown into the fields, they will bound the excessive growth of the city with a graceful border which is now encircled with scavenger's dung-stalls."*

§ 30. I might submit the concurrent opinions of several distinguished clergymen, communicated in reference to the general view of the importance of a large change in the practice of town interments, and the formation of suburban cemeteries, as being indeed conformable to the practice of the Jews and early Christians, and recognised in the words "There was a dead man carried out." It was the ancient practice, as is perhaps indicated in the term exsequies, to bury outside of the town.† To this practice it is clear that the earliest Christians conformed. It was their custom to assign to the martyrs the most conspicuous places, over which altars or monuments were erected, where the believers used to assemble for nightly worship, so that it may rather be said of them that their burial-places were their churches, than that their churches were their burial-places.‡ When the temples of the heathen gods were converted into Christian churches, the *bones* or

* Vide Appendix for an exemplification of the excess of deaths and funerals, and other losses incurred by setting aside Sir Christopher Wren's plan for the rebuilding of the city of London.

† One of the twelve tables was in these words, "*Hominem mortuum in urbe ne sepelito neve urito.*" Cicero, in one of his epistles, Epist. ad Div. iv. 12, in which he describes the assassination of his friend M. Marcellus, at Athens, mentions that he had been unable to obtain permission of the Athenians that the body should be buried in the city; they said that such permission was inadmissible on religious grounds, and that it never had been granted to any one.

‡ Bingham's Christian Antiquities, b. xxiii. ch. 1. § 2.

relics of these illustrious persons, together with the altars, were removed and placed within the churches. The early practice of burial in the cemeteries near the earthly remains of those holy persons, being deemed a great privilege when those remains were removed, naturally led to the idea of its continuation, by the interment of *bodies* in or about the first accustomed object of worship. Nevertheless, interment in the interior of the church was held to be an unusual piece of good fortune, and when the Emperor Constantine, who had constituted Christianity the religion of the state, had granted to him a grave within the porticos of the church, it was esteemed the most unheard-of distinction. The ancient Greeks and Romans thought that a corpse contaminated a sacred place, and this idea as to the corpse was retained by the early Christians. When some persons in Constantinople began to make an invasion upon the laws, under pretence that there was no express prohibition of burying in churches, Theodosius, by a new law, equally forbade them burying in cities and burying in churches; and this whether it was only the ashes or relics of any bodies kept above ground in urns or whole bodies laid in coffins; for the same reasons that the old laws had assigned, viz., that they might be examples and memorials of mortality and the condition of human nature to all passengers, and also that they might not defile the habitations of the living but leave it pure and clean to them. St. Chrysostom, in one of his homilies upon the martyrs, says, "As before when the festival of the Maccabees was celebrated all the country came thronging into the city; so now when the festival of the martyrs who lie buried in the country is celebrated, it was fit the whole country should remove thither." In like manner, speaking of the festival of Drossis the martyr, he says, "Though they had spiritual entertainment in the city, yet their going out to the saints in the country afforded them both great profit and pleasure." The Council of Tribur, in the time of Charlemagne, to prevent the abuse of burying within churches, decreed that *no layman* should thenceforth be buried within a church; and that if in any church, graves were so numerous that they could not be concealed by a pavement, the place was to be converted into a cemetery, and the altar to be removed elsewhere and erected in a place where sacrifice could be religiously offered to God.

Amongst the distinct clerical orders of the Primitive Church, Bingham (book iii. chap. 7) reckons the *Psalmistæ*, the *Copiatæ*, and the *Parabolani*. The *Psalmistæ*, or the canonical singers, were appointed to retrieve and improve the psalmody of the church. The business of the *Copiatæ* was to take care of funerals and provide for the decent interment of the dead. St. Jerome styles them *Fossarii*, from digging of graves; and in Justinian's Novels they are called *Lecticarii*, from carrying the corpse or bier at funerals. And St. Jerome, speaking of one that was to be interred, "The *Clerici*," says he, "whose office it was, wound up the body digged the earth," and so, according to custom, "made ready the grave."

Constantine incorporated a body of men to the number of 1100 in Constantinople, under the name of *Copiatæ*, for the service in question, and so they continued until the time of Honorius and Theodosius, junior, who reduced them to 950; but Anastatius augmented them again to the first number, which Justinian confirmed by two novels, published for that purpose. Their office was to take the whole care of funerals upon themselves, and to see that all persons had a decent and honourable interment. Especially they were obliged to perform this last office to the poorer people without exacting any thing of their relations upon that account. The *Parabolani* were incorporated at Alexandria to the number of 500 or 600, who were deputed to attend upon the sick, and take care of their bodies in time of weakness.* [Cod. Theod. leg. 43 :—*Parabolani, qui ad curanda debiliū corpora deputantur, quingentos esse ante præcipimus; sed quia hos minus sufficere in præsentī cognovimus, pro quingentis sex centos constitui præcipimus,*" &c.] They were called *Parabolani* from their undertaking (*Παραβολον ἔργον*) a most dangerous office in attending the sick. The foundation of a great city like Constantinople must have brought the magnitude of the service of the burial of the whole population distinctly under view, and have necessitated comprehensive and systematic arrangements of a corresponding extent, by the superintendence of superior officers through the gradations of duty of a disciplined force, which, even with the Eastern redundance of service, could scarcely have failed to be efficient and economical as compared with numerous separated and isolated efforts. A great prototype was thus gained, and the well-considered gradations of duty and service of the great city was carried out as far as practicable in the small parish. In some churches where there was no such standing office as the *Copiatæ* or the *Parabolani*, the Penitents were obliged to take upon themselves the office and care of burying the dead; "and this by way of discipline and exercise of humility and charity which were so becoming their station." *Bingham*, book xviii. cap. 2. The state of administrative information in these our times may surely be deplored, when any views can be entertained of making the small parish and the rude and barbarous service (multiplied, at an enormous expense) of the really unsuperintended common gravedigger and sexton, the prototypes for this most important and difficult branch of public administration of the greatest metropolis in the modern world.

On a full consideration I think it will be apparent that the exclusion of the burial of corpses in churches or in churchyards, and the adoption of burials in cemeteries, and the conspicuous interment there of all individuals whose lives and services have graced communities, will, in so far as it is carried out, be in principle a return to the primitive practice, restoring to the many the privilege, of which they are necessarily deprived by burials in

* Vide Leviticus, chap. xiv. verse 33 to 48, for early sanitary measures of purification.

churches, of association in sepulture with the illustrious dead, and giving to these a wider sphere of attention and honour, and beneficent influence.

§ 31. Where the circumstances described in respect to the Protestant population, have prevented compliance with the popular desire for hymns or anthems to be sung, or sermons to be spoken at the burial at the parochial churches in London, interment has been purchased for the express purpose of obtaining them at the trading burial-grounds. And yet it may be submitted that the desire is consistent with the earliest recognised practice for all classes, and that a system of national cemeteries would in proportion to the numbers interred in them, furnish valuable cases as examples for its beneficial exercise, and must, to a great extent, prevent the misapplication of the service to such cases as have apparently caused it to fall in public esteem.

"The honour," says Hooker, "generally due unto all men maketh a decent interring of them to be convenient, even for very humanity's sake. And therefore so much as is mentioned in the burial of the widow's son, the carrying him forth upon a bier and accompanying him to the earth, hath been used even amongst infidels, all men accounting it a very extreme destitution not to have at least this honour due to them." * * * * "Let any man of reasonable judgment examine whether it be more convenient for a company of men, as it were, in a dumb show to bring a corpse to a place of burial, there to leave it, covered with earth, and so end, or else to have the exsequies devoutly performed with solemn recitals of such lectures, psalms and prayers, as are purposely framed for the stirring up of men's minds into a careful consideration of their estate both here and hereafter.

"In regard to the quality of men, it hath been judged fit to commend them unto the world at their death amongst the heathen in funeral orations; amongst the Jews in sacred poems; and why not in funeral sermons amongst Christians? Us it sufficeth that the known benefit hereof doth countervail millions of such inconveniences as are therein surmised, although they were not surmised only, but found therein." * * * "The care no doubt of the living, both to live and die well, must needs be somewhat increased when they know that their departure shall not be folded up in silence, but the ears of many be made acquainted with it. The sound of these things do not so pass the ears of them that are most loose and dissolute in life, but it causeth them one time or other to wish, 'Oh that I might die the death of the righteous, and that my end might be like his.' Thus much peculiar good there doth grow at those times by speech concerning the dead; besides the benefit of public instruction common unto funeral with other sermons."—*Hooker, Ecclesiastical Polity*, b. v. ch. lxxv.

"When thou hast wept awhile," says Jeremy Taylor, in his *Holy Dying*, "compose the body to burial; which, that it be done gravely, decently, and charitably, we have the example of

all nations to engage us, and of all ages of the world to warrant; so that it is against common honesty and public fame and reputation not to do this office.”—“The church, in her funerals of the dead, used to sing psalms and to give thanks for the redemption and delivery of the soul from the evil and dangers of mortality.”—“Solemn and appointed mournings are good expressions of our deariness to the departed soul, and of his worth and our value of him, and it hath its praise in nature, and in manners, and in public customs; but the praise of it is not in the gospel, that is, it hath no direct and proper uses in religion; for if the dead did die in the Lord, then there is joy to him, and it is an ill expression of our affection and our charity to weep uncomfortably at a change that hath carried my friend to the state of a huge felicity.”—“Something is to be given to custom, something to fame, to nature and to civilities, and to the honour of deceased friends; for that man is esteemed to die miserable for whom no friend or relation sheds a tear, or pays a solemn sigh. I desire to die a dry death, but am not very desirous to have a dry funeral; some flowers sprinkled on my grave would do well and comely; and a soft shower, to turn those flowers into a springing memory or a fair rehearsal, that I may not go forth of my doors, as my servants carry the entrails of beasts.” * * * *

“Concerning doing honour to the dead the consideration is not long. Anciently the friends of the dead used to make their funeral oration, and what they spake of greater commendation was pardoned on the accounts of friendship; but when Christianity seized on the possession of the world, this charge was devolved on priests and bishops, and they first kept the custom of the world and adorned it with the piety of truth and of religion; but they also ordered it that it should not be cheap; for they made funeral sermons only at the death of princes, or of such holy persons ‘who shall judge the angels.’ The custom descended, and in the channels mingled with the veins of earth, through which it passed; and now-a-days, men that die are commended at a price, and the measure of their legacy is the degree of their virtue. But these things ought not so to be; the reward of the greatest virtue ought not to be prostitute to the doles of common persons, but preserved like laurels and coronets to remark and encourage the noblest things. Persons of an ordinary life should neither be praised publicly, nor reproached in private; for it is an offence and charge of humanity to speak no evil of the dead, which, I suppose, is meant concerning things not public and evident; but then neither should our charity to them teach us to tell a lie, or to make a great flame from a heap of rushes and mushrooms, and make orations crammed with the narrative of little observances, and acts of civil, necessary and eternal religion. But that which is most considerable is, that we should do something for the dead, something that is real and of proper advantage. That we perform their will, the laws oblige

us, and will see to it; but that we do all those parts of personal duty which our dead left unperformed, and to which the laws do not oblige us, is an act of great charity and perfect kindness.”—
 “ Besides this, let us right their causes and assert their honour:”
 * * “ and certainly it is the noblest thing in the world to do an act of kindness to him whom we shall never see, but yet hath deserved it of us, and to whom we would do it if he were present; and unless we do so, our charity is mereenary, and our friendships are direct merchandise, and our gifts are brocage: but what we do to the dead, or to the living for their sakes, is gratitude, and virtue for virtue’s sake, and the noblest portion of humanity.”

Exposition of the English Law in respect to Perpetuities in Public Burial-Grounds.

[From the decision in the case of *Gilbert v. Buzzard* and *Boyer*, 2 Haggard’s Reports of Cases argued and determined in the Consistory Court of London, containing the Judgments of the Right Hon. Lord Stowell.]

§ 32. In what way the mortal remains are to be conveyed to the grave, and there deposited, I do not find any positive rule of law, or of religion, that prescribes. The authority under which the received practices exist, is to be found in our manners, rather than in our laws: they have their origin in natural sentiments of public decency and private affection; they are ratified by common usage and consent; and being attached to a subject of the gravest and most impressive nature, remain unaltered by private caprice and fancy, amidst all the giddy revolutions that are perpetually varying the modes and fashions that belong to the lighter circumstances of human life. That bodies should be carried in a state of naked exposure to the grave, would be a real offence to the living, as well as an apparent indignity to the dead. Some involucra, or coverings, have been deemed necessary in all civilized and Christian countries; but chests or trunks containing the bodies, descending along with them into the grave, and remaining there till their own decay, cannot plead either the same necessity, or the same general use.

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The rule of law which says, that a man has a right to be buried in his own churchyard, is to be found, most certainly, in many of our authoritative text writers; but it is not quite so easy to find the rule which gives him the right of burying a large chest or trunk in company with himself. That is no part of his original and absolute right, nor is it necessarily involved in it. That right, strictly taken, is to be returned to his parent earth for dissolution, and to be carried thither in a decent and inoffensive manner. When these purposes are answered, his rights are, perhaps, fully satisfied in the strict sense in which any claim, in the nature of an absolute right, can be deemed to extend.

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It has been argued, that the ground once given to the body is appropriated to it for ever; it is literally in mortmain unalienably; it is not only the *domus ultima*, but the *domus æterna*, of that tenant, who is never to be disturbed, be his condition what it may; the introduction of another body into that lodgment at any time, however distant, is an unwarrantable intrusion. If these positions be true, it certainly follows, that the question of comparative duration sinks into utter insignificance.

In support of them, it seems to be assumed, that the tenant himself is imperishable; for, surely, there can be no inextinguishable title, no perpetuity of possession, belonging to a subject which itself is perishable. But the fact is, that “man” and “for ever” are terms quite incompatible in any state of his existence, dead or living, in this world. The time must come when “*ipsæ periere ruinæ*,” when the posthumous remains must mingle with, and compose

a part of, that soil in which they have been deposited. Precious embalmments, and costly monuments may preserve for a long time the remains of those who have filled the more commanding stations of human life; but the common lot of mankind furnishes no such means of conservation. With reference to them, the *domus aeterna* is a mere flourish of rhetoric; the process of nature will speedily resolve them into an intimate mixture with their kindred dust; and their dust will help to furnish a place of repose for other occupants in succession. It is objected, that no precise time can be fixed at which the mortal remains, and the chest which contains them, shall undergo the complete process of dissolution, and it certainly cannot; being dependent upon circumstances that vary, upon difference of soils, and exposures of seasons and climates; but observation can ascertain them sufficiently for practical use. The experience of not many years is required to furnish a sufficient certainty for such a purpose.

Founded on such facts and considerations, the legal doctrine certainly is, and has remained, unaffected; that the common cemetery is not *res unius aetatis*, the property of one generation now departed, but is, likewise, the common property of the living, and of generations yet unborn, and is subject only to temporary appropriations. There exists in the whole a right of succession, which can be lawfully obstructed only in a portion of it, by public authority, that of the ecclesiastical magistrate, who gives occasionally an exclusive title, in such portion, to the succession of some family, or to an individual, who has a fair claim to be favoured by such a distinction; and this, not without a just consideration of its expedience, and a due attention to the objections of those who oppose such an alienation from the common property. Even a bricked grave, granted without such an authority, is an aggression upon the common freehold interests, and carries the pretensions of the dead to an extent that violates the rights of the living.

If this view of the matter be just, all contrivances that, whether intentionally or not, prolong the time of dissolution beyond the period at which the common local understanding and usage have fixed it, is an act of injustice, unless compensated in some way or other. In country parishes, where the population is small, and the cemetery is large, it is a matter less worthy of consideration; more ground can be spared, and less is wanted; but, in populous parishes, in large and crowded cities, the indulgence of an exclusive possession is unavoidably limited; for, unless limited, evils of most formidable magnitude take place. Churchyards cannot be made commensurate to the demands of a large and increasing population; the period of decay and dissolution does not arrive fast enough in the accustomed mode of depositing bodies in the earth, to evacuate the ground for the use of succeeding claimants; new cemeteries must be purchased at an enormous expense to the parish, and to be used at an increased expense to families, and at the inconvenience of their being compelled to resort to very inconvenient distances for attending on the office of interment.

In this very parish three additional burial-grounds are alleged to have been purchased, and to be now nearly filled. This is the progress of things in their ordinary course; and if to this is to be added the general introduction of a new mode of interment, which is to ensure to bodies a much longer possession, the evil will become intolerable, and a comparatively small portion of the dead will shoulder out the living and their posterity. The whole environs of this metropolis will be surrounded with a circumvallation of churchyards, perpetually increasing, by becoming themselves surcharged with bodies, if indeed land-owners can be found who will be willing to divert their ground from the beneficial uses of the living to the barren preservation of the dead, contrary to the humane maxim quoted by Tully from Plato's Republic:—"Quæ terra fruges ferre, et, ut mater, cibos, suppeditare possit, eam ne quis nobis minuât, neve vivus neve mortuus."

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